Integrative Levels of Knowing:
A Cognitive-Developmental Approach to Knowledge Organization

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ABSTRACT

This dissertation is concerned with a systematic organization of the epistemological dimension of human knowledge in terms of viewpoints and methods. In particular, it will be explored to what extent the well-known organizing principle of *integrative levels* that presents a developmental hierarchy of complexity and integration can be applied for a basic classification of viewpoints or epistemic outlooks.

In the last decades of research in the field of knowledge organization, there has been an increasing interest in the context factor regarding the production, mediation, and consumption of knowledge as it is symbolically mediated and recorded in documents. This is often indicated by a *pragmatic turn* emphasizing the epistemic activities that are involved in knowledge exchange or information interaction and which need to be considered in its cognitive, cultural, and historical contexts. Such an epistemic pluralism calls for a multi-perspective knowledge organization that makes explicit the underlying frames of reference of the principal actors of information systems including authors as producers, information professionals as mediators, and users as consumers of documents.

The present study approaches such frames of reference or epistemic contexts at two analytical dimensions. The first dimension is related to *knowledge organization in context* referring to the fact that knowledge organization systems like classifications, thesauri, and formal ontologies are by no means neutral representations of reality but culturally and historically embedded human artifacts that serve a given purpose. This part is concerned with the context of knowledge mediation and will be illustrated by an exemplary case study concerned with a cross-cultural comparison of the ancient Chinese library classification known as the *Seven Epitomes*. The second dimension is related to *context in knowledge organization* referring to the context representation in document indexing that goes beyond the traditional

subject representation in that it takes the authorial perspectives of documents into account, such as underlying viewpoints and applied methods. This part is concerned with the context of knowledge production and will be illustrated by an exemplary case study concerned with the representation of authorial perspectives in the interdisciplinary knowledge organization system *Integrative Levels Classification*.

The central thesis pursued in this investigation is that both dimensions require adequate tools for context analysis in order to compare and evaluate divergent or even conflicting frames of reference according to context-transcending standards and criteria. This task demands a theoretical and methodological foundation that avoids the limitation of a radical contextualism and its inherent threat of a fragmentation of knowledge due to the alleged incommensurability of epistemic contexts. Based on Jürgen Habermas's *Theory of Communicative Action*, particularly, his formal pragmatics and rational reconstruction of symbolically mediated utterances, it will be argued that epistemic pluralism does not necessarily imply epistemic relativism and that a systematic organization of the epistemological dimension of human knowledge can benefit from already existing models of cognitive development as reconstructed in research fields like psychology, social sciences, and humanities.

The proposed cognitive-developmental approach to knowledge organization is intended to contribute to a multi-perspective knowledge organization in that it offers both analytical tools for cross-cultural comparisons of knowledge organization systems, as well as principles of organization for context representation that may help to improve the expressiveness of existing documentary languages.

ZUSAMMENFASSUNG

Diese Dissertation beschäftigt sich mit einer systematischen Organisation der epistemologischen Dimension des menschlichen Wissens in Bezug auf Perspektiven und Methoden. Insbesondere wird untersucht inwieweit das bekannte Organisationsprinzip der *integrativen Ebenen*, das eine Hierarchie zunehmender Komplexität und Integration beschreibt, geeignet ist für eine grundlegende Klassifikation von Perspektiven bzw. epistemischen Bezugsrahmen.

In den letzten Jahrzehnten der Forschung im Bereich der Wissensorganisation stieg das Interesse am Kontextfaktor bezogen auf die Produktion, Vermittlung und Nutzung von Wissen wie es symbolisch vermittelt und in Dokumenten aufbewahrt wird. Dies zeigt sich oft an einer *pragmatischen Wende* mit der Betonung von epistemischen Aktivitäten, die beim Wissens- bzw. Informationsaustausch involviert sind und in ihren kognitiven, kulturellen und historischen Kontexten betrachten werden müssen. Ein solcher epistemischer Pluralismus erfordert eine multi-perspektivische Wissensorganisation, welche die zugrundeliegenden Bezugsrahmen der Hauptakteure von Informationssystemen explizit macht wie insbesondere von Autorinnen und Autoren, von Information Professionals und von Nutzenden.

Die vorliegende Studie untersucht solche Bezugsrahmen bzw. epistemischen Kontexte bezogen auf zwei analytische Dimensionen. Die erste Dimension, *Wissensorganisation im Kontext*, bezieht sich auf die Tatsache, dass Wissensorganisationssysteme wie Klassifikationen, Thesauri oder formale Ontologien keine neutralen Repräsentationen der Wirklichkeit darstellen, sondern kulturell und historisch eingebettete menschliche Artefakte sind, die einem bestimmten Zweck dienen. Dieser Teil beschäftigt sich mit dem Kontext der Wissensvermittlung und wird veranschaulicht anhand einer kulturvergleichenden Fallstudie zur antiken chinesischen Bibliotheksklassifikation namens *Seven Epitomes*. Die zweite Dimension, *Kontext in der Wissensorganisation*, bezieht sich auf die Kontextdarstellung bei der Erschließung von Dokumenten, die über eine traditionelle Sacherschließung hinaus geht, indem die epistemischen Bezugsrahmen von Autorinnen und Autoren berücksichtigt werden wie etwa

zugrundeliegende theoretische und methodische Ansätze. Dieser Teil beschäftigt sich mit dem Kontext der Wissensproduktion und wird veranschaulicht anhand einer Fallstudie zum interdisziplinären Wissensorganisationssystem namens *Integrative Levels Classification*.

Die zentrale These dieser Dissertation geht davon aus, dass eine angemessene Kontextanalyse für beide Dimensionen in der Lage sein sollte unterschiedliche oder gar konfligierende Bezugsrahmen anhand von kontextübergreifenden Standards und Kriterien vergleichen und bewerten zu können. Diese Aufgabe erfordert theoretische und methodologische Grundlagen, welche die Beschränkungen eines radikalen Kontextualismus vermeiden, insbesondere die ihm innewohnende Gefahr einer Fragmentierung des Wissens aufgrund der angeblichen Inkommensurabilität epistemischer Kontexte. Basierend auf Jürgen Habermas' *Theorie des kommunikativen Handelns*, insbesondere seiner Formalpragmatik und rationalen Rekonstruktion symbolisch vermittelter Äußerungen, wird argumentiert, dass ein epistemischer Pluralismus nicht zwangsläufig zu einem epistemischen Relativismus führen muss und dass eine systematische Organisation der epistemologischen Dimension des menschlichen Wissens von bereits existierenden Modellen zur kognitiven Entwicklung profitieren kann, die in Forschungsbereichen wie Psychologie, Sozialwissenschaften und Kulturwissenschaften rekonstruiert werden.

Der vorgestellte Ansatz versteht sich als ein Beitrag zur multi-perspektivischen Wissensorganisation, der sowohl neue analytische Werkzeuge für kulturvergleichende Betrachtungen von Wissensorganisationssystemen bereitstellt, als auch neue Organisationsprinzipien vorstellt für eine Kontexterschließung, die dazu beitragen kann die Ausdrucksstärke bereits vorhandener Dokumentationssprachen zu erhöhen.

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ABBREVIATIONS

AACR2	=	Anglo-American Cataloguing Rules, second edition
ACLU	=	American Civil Liberties Union
ACM	=	Association for Computing Machinery
AES	=	Applied Energy Services
AQAL	=	All Quadrants, All Levels
BARD	=	BioAcoustic Reference Database
BARTOC	=	Basel Register of Thesauri, Ontologies and Classifications
BCC	=	Basic Concepts Classification
BCE	=	Before Common Era
BCFBL	=	Bibliographical Classification of the Four Branches of Literature
BC2	=	Bibliographic Classification, second edition
CC	=	Colon Classification
CCB	=	Chinese Classification of Books
CDC	=	Chinese Decimal Classification
CE	=	Common Era
CHAT	=	Cultural Historical Activity Theory
CIP Data	=	Library of Congress Cataloging-in-Publication Data
Conop	=	Concrete-operational
CRG	=	Classification Research Group
D1-D5	=	Dichotomies 1-5
DDC	=	Dewey Decimal Classification
DEPA	=	Discipline, Entity, Property, Action
DERA	=	Domain, Entity, Relation, Attribute
DIKW	=	Data, Information, Knowledge, Wisdom
ESZB	=	European System of Central Banks
Formop	=	Formal-operational
ICC	=	Information Coding Classification
ILC	=	Integrative Levels Classification (ILC1 = first edition, ILC2 = second edition)
ILK	=	Integrative Levels of Knowing
IMP	=	Integral Methodological Pluralism
INRC	=	Identity, Negation, Reciprocity, Correlation

IR	=	Information Retrieval
IS	=	Information Science
ISKO	=	International Society for Knowledge Organization
ISO	=	International Organization for Standardization
KDC	=	Korean Decimal Classification
KO	=	Knowledge Organization
KOS	=	Knowledge Organization System
LaREA	=	Friuli Venezia Giulia Regional Laboratory of Environmental Education
LCC	=	Library of Congress Classification
LIS	=	Library and Information Science
MeSH	=	Medical Subject Headings
MHC	=	Model of Hierarchical Complexity
NDC	=	Nippon Decimal Classification
OCLC	=	Online Computer Library Center
OPAC	=	Online Public Access Catalog
PMEST	=	Personality, Matter, Energy, Space, Time
PRECIS	=	Preserved Context Index System
Preop	=	Preoperational
RDA	=	Resource Description and Access
RDS	=	Resource Discovery System
SCT	=	Sentence Completion Test
SE	=	Seven Epitomes
SF	=	Structure Function
SKOS	=	Simple Knowledge Organization System
TREC	=	Text Retrieval Conference
UDC	=	Universal Decimal Classification
vMEME	=	Value Meme

"Only a systematic history of rationality would keep us from falling into sheer relativism or naively positing our own standards as absolute."

Jürgen Habermas

Theory of Communicative Action

1 INTRODUCTION

1.1 The Blind Men and the Elephant

There is an old and well-known story about some blind men who encounter an elephant. It presents a parable about the multi-perspective nature of human knowledge and thus about one of the most important challenges regarding the organization of knowledge. Each of the blind men approaches a different part of the unknown creature and gives a completely different description of the very same object under investigation. One of them examines the trunk and describes it as a rope, someone else scrutinizes a leg and describes it as a tree, and a third one inspects an ear and describes it as a wing, and so on. Consequently, the blind men dispute about who is right and who is wrong, ignoring the fact that they are all partly right by emphasizing a specific aspect but also partly wrong by overgeneralizing their own vantage point. The moral of this story, commonly referred to as *The Blind Men and the Elephant*, seems to be obvious: A big-picture view is possible as soon as the investigators are able to transcend their own limited perspective, the proverbial blindness, by integrating and interrelating the perspectives of the others.

However, the traditional interpretation of this parable seems to be restricted to the ontological dimension of human knowledge at the expense of the epistemological dimension. On one hand, the ontological dimension is concerned with the nature of being or the basic structures of reality and related to phenomena someone is *looking at*. On the other hand, the epistemological dimension refers to the way in which processes of knowing are constituted or influenced by a frame of reference or the lens someone is *looking through*. If the elephant represented reality as such and the blind men represented different approaches to investigate reality, then an ontological understanding would interpret these multiple perspectives as related to different aspects of being. For example, scientific disciplines like quantum physics,

neurochemistry, or sociobiology describe different aspects of the same reality according to their level of analysis. Therefore, a main challenge of ontology-oriented approaches to knowledge organization (KO) is to identify organizing principles that allow to interrelate these different aspects of reality within a comprehensive framework (Dahlberg 1978; Poli 1996).

In KO research, one of the most influential principles of organization is presented by the idea of *integrative levels*, a term invented by biochemist and sinologist Joseph Needham (1937), sometimes referred to as levels of reality or levels of being (CRG 1969; Dahlberg 1974; Dousa 2009; Szostak, Gnoli, and López-Huertas 2016; Kleineberg 2017). Douglas J. Foskett (1961, 139) expresses the idea as follows:

> The theory of integrative levels is that the world of things evolves from the simple towards the complex by an accumulation of properties, and that, at a succession of levels, these aggregations reach new degrees of complexity and become new wholes, with individual and unique identities.

In other words, integrative levels present a developmental sequence in which entities at each new level integrate the characteristic properties and structures of the entities at the older levels, while exhibiting some emergent qualities and, therefore, more complexity than their predecessors. A typical example of such a hierarchy of complexity and integration is given by the sequence atoms—molecules—cells—organisms (Feibleman 1954, 62). The strength of the idea of integrative levels is considered to be its synthesizing force enabling a non-reductionist organization of the plethora of known phenomena based on logically coherent order relations and a general scope of coverage (Foskett 1978; Szostak, Gnoli, and López-Huertas 2016; Kleineberg 2017). Even before the invention of the term, the idea of integrative levels has been applied to classifications of sciences, for example, by Auguste Comte or Herbert Spencer. Since then this organizing principle is explicitly or implicitly used for knowledge organization systems (KOSs) including universal or general classifications for libraries (Dousa 2009; Gnoli 2017a).

Such ontology-oriented approaches, however, are often based on the problematic assumption that the known object can be considered independently from the subject or epistemic community knowing them. After an interpretive turn in the philosophy and sociology of knowledge such an assumption would be hard to defend since the known and the knower appear to be inextricably interwoven (Mai 1999; Brier 2000; Hjørland 2002; Frohmann 2004; Svenonius 2004). This is where the role of epistemic contexts comes into play since the knowing subject is always already embodied as a material organism and embedded in a social and cultural environment at a given point in time. Consequently, the known object is not simply a neutral and objective representation of reality but to some extent constructed in relation to a context-situated frame of reference, such as Ludwig Wittgenstein's (2010) language game, Hans-Georg Gadamer's (2013) historical horizon, Thomas S. Kuhn's (1970) paradigm, and Michel Foucault's (2004) episteme, to name only a few prominent ones.

Therefore, a more contemporary interpretation of the parable *The Blind Men and the Elephant* needs also to include the epistemological dimension that is concerned with the preconditions and constraints of the process of knowing. This means that even if all blind men (and a more contemporary version should certainly include blind women and blind children as well) investigated the same part of the elephant, they would probably dispute again due to their different frames of reference (Kleineberg 2013a). An epistemological understanding would interpret these multiple perspectives as different ways of thinking or forms of knowing that constitute an epistemic pluralism. Nevertheless, even according to this interpretation, the moral of the story might be the same: A big-picture view is possible as soon as the investigators are able to transcend their own limited perspective, the proverbial blindness, by including and interrelating the perspectives of the others.

While epistemic pluralism is widely accepted in KO discourse, prevailing epistemology-oriented approaches to knowledge organization tend to deny the possibility of such a big-

picture view (Talja, Keso, and Pietiläinen 1999; Jacob 2000; Mai 2004; Olson 2009). Based on the premise that human knowledge is always context-dependent, the conclusion is often drawn that epistemic contexts cannot be transcended or compared to each other since the standards of rationality itself are supposed to be different for every context or frame of reference. Consequently, epistemic pluralism would be in danger to end up in epistemic relativism and the blind people would be doomed to remain prisoners of their own blindness.

Departing from the same premise of the unavoidably context-dependent nature of human knowledge, the guiding research question addressed by the present study is this: How can the multiplicity of perspectives inherent in epistemic pluralism be organized in a comprehensive and systematic way without falling prey to epistemic relativism? In analogy to the organization of the ontological dimension, it will be asked to what extent the principle of integrative levels can be applied for an organization of the epistemological dimension in terms of Integrative Levels of Knowing.

1.2 Outline of the Dissertation

The present study is divided into seven chapters including an introduction, two case studies, and a conclusion. Additionally, there is an appendix containing samples of conceptions and models of Integrative Levels of Knowing collected from a large body of literature.

This introduction chapter illustrates the main challenge of a multi-perspective knowledge organization, shows the direction for a possible solution, and outlines the structure of the dissertation. The starting point is the assumption that since human knowledge is always context-dependent the underlying epistemic contexts should be made explicit. It will be argued that the resulting epistemic pluralism should be organized in a systematic way to avoid a fragmentation of knowledge. The challenge of such a systematization, however, is to identify

principles of organization that do not dependent on a single context but can be applied to epistemic contexts in general.

Chapter Two, *Knowledge Organization and Epistemic Pluralism*, opens the horizon for the general problem constellation by reviewing recent theories of knowledge organization and their underlying epistemologies from a library and information science perspective. While predominant theories of knowledge from pragmatism to historicism to various kinds of constructivism agree about the context-dependent nature of human knowledge and the importance to acknowledge different frames of reference (Jacob 2000; Svenonius 2000; Mai 2011; Smiraglia and Lee 2012b; Hjørland 2013b; López-Huertas 2013), there is much less theorizing about how to cope with the challenge of a fragmentation of knowledge. It will be shown that prevailing context-aware approaches to knowledge organization, exemplified by the methodologies of polyrepresentation analysis (Ingwersen and Järvelin 2005; Larsen, Ingwersen, and Kekäläinen 2006), domain analysis (Hjørland and Albrechtsen 1995; Mai 2005), and genealogical discourse analysis (Frohmann 1994; Olson 2002; Smiraglia, Lee, and Olson 2011; Fox 2015) tend to be in danger that epistemic pluralism leads to epistemic relativism. This is to say that the mere existence of multiple perspectives already implies that these perspectives are incommensurable to each other since there is neither a neutral "view from nowhere" (Nagel 1986, 1) nor a common measure against which the validity of knowledge claims could be evaluated across contexts. This problem has often been articulated as the famous *thesis of incommensurability* (Kuhn 1970; Feyerabend 1975). Taking seriously, this would eventually lead to a fragmentation and disorder of epistemic contexts. For the field of knowledge organization, this could mean that the various domain-specific documentary languages remain idiosyncratic and untranslatable to each other. For the same reason, the representation of context information in document indexing could lack an adequate analytical framework and principles for an organization of epistemic contexts in general. In analogy to

Henry E. Bliss's (1933, 301) "subject-index illusion" stating that an indexing of the subject matter of documents without an underlying systematic organization of knowledge subjects in general remains pointless, this problem might be called the *context-index illusion*.

Chapter Three, *Organizing the Epistemological Dimension*, proposes an alternative non-relativistic approach to epistemic pluralism and introduces the organizing principle of Integrative Levels of Knowing. In semiotic terms, the analysis of epistemic contexts refers to the pragmatic dimension in linguistics concerned with the relation between a symbolic expression and its use by communicative actors. As a theoretical and methodological foundation, Jürgen Habermas's (1984; 1987) Theory of Communicative Action will be adopted in which a distinction is made between *empirical pragmatics* investigating context-specific utterances (e.g., sociolinguistics) and universal or *formal pragmatics* that seeks to reconstruct general patterns and conditions of language use that apply to all possible contexts in terms of communicative competence. Based on his formal pragmatics, Habermas's (1979, 2003a) methodology of hermeneutic reconstructionism analyzes the author's implicit know-how or intuitive rule consciousness of language in terms of the generative structures or frames of reference according to which a symbolic expression has been brought forth. According to Habermas, communicative competence is the result of learning processes following a rationally reconstructable pattern. Such learning processes are studied by cognitive-developmental approaches in psychology and, for Habermas, are best described in the tradition of Jean Piaget's genetic or developmental structuralism emphasizing the underlying logic of development. In the present study, such a developmental pattern is termed Integrative Levels of Knowing since it exhibits the same formal properties attributed to the traditional organizing principle of integrative levels coined by Joseph Needham (1937) and James Feibleman (1954). First, there are qualitatively distinct levels of phenomena. Second, there is an invariant sequence of the development of these levels. And third, there are hierarchical integrations in

the way that phenomena at newer and higher levels include the characteristic properties and structures of older lower-level phenomena. A typical example for integrative levels of the epistemological dimension of human knowledge is given by the cognitive-developmental sequence: sensorimotor—preoperational—concrete-operational—formal-operational (Piaget 1977, 456–63). Habermas (1990) argues that such cognitive-developmental stages or Integrative Levels of Knowing refer to presumably universal learning capacities and offer a comparative tool for mutual contradicting frames of reference. In a first step, the empirical diversity of epistemic perspectives can be reduced to variation in the *contents*, in contrast to the universal *forms*. And in a second step, the remaining differences between forms of knowing can be explained as differences in the stage or level of cognitive development. As a heuristic device, Ken Wilber's (2000) AQAL framework (abbreviation for All Quadrants, All Levels) based on formal-pragmatic distinctions and the organizing principle of integrative levels will be introduced in order to provide a point of reference for a discussion of various approaches of both individual development and collective development.

Chapter Four, *The Cognitive-Developmental Approach to Knowledge Organization*, presents an overview of major research traditions of human development providing conceptions of Integrative Levels of Knowing, namely, the *cognitive-developmental theory* rooted in genetic structuralism (e.g., Jean Piaget, Lawrence Kohlberg, Robert L. Selman), the *psychosocial theory* rooted in analytic ego psychology (e.g., Erik H. Erikson, Jane Loevinger, Susanne R. Cook-Greuter), the *cognitive social-historical theory* rooted in the cultural-historical school of Russian psychology (e.g., Lev S. Vygotsky, Alexander R. Luria, Alexei N. Leontiev), and the *dynamic systems theory* or relational developmental systems theory (e.g., Kurt W. Fischer, Willis F. Overton, Richard M. Lerner). To address common criticisms and to avoid potential misconceptions, the idea of Integrative Levels of Knowing requires important qualifications. Therefore, analytical distinctions are discussed between structural, functional, and age-related

aspects; between developmental-dynamical and developmental-logical aspects; between descriptive, explanatory, and normative aspects; as well as between domain-general and domain-specific aspects. Derived from the described cognitive-developmental research traditions, some of the most elaborate models of Integrative Levels of Knowing will be presented as reconstructions of domain-specific lines of human thinking and knowing for both individual development (e.g., logico-mathematical reasoning, moral consciousness, aesthetic experience) and collective development (e.g., worldview, science, religion, art). The chapter will close with a brief outline of how these models of Integrative Levels of Knowing have already been applied to the analysis of authorial perspectives of documents.

Chapter Five, *Case Study I: The Ancient Chinese Library Classification* Seven Epitomes, applies the proposed cognitive-developmental approach to a particular knowledge organization system under consideration of its epistemic context in order to provide a point of departure for a comparative cross-cultural analysis. The example of the *Seven Epitomes*, which presents in many ways a significant contrast to modern library classifications like the *Dewey Decimal Classification*, is chosen for several reasons. First, the classification system of *Seven Epitomes* is well documented in a recent research project (Lee 2010b; 2012a; 2016; Lee and Lan 2011). Second, it presents an obvious cultural distance, namely, between China and the West. And third, it presents an obvious historical distance between ancient and modern times. This distinction between a cultural distance (synchronic dimension) and a historical distance (diachronic dimension), not discussed by Hur-Li Lee's (2016) socio-epistemological approach, appears to be indispensable for a comparison of KOSs within different epistemic contexts because otherwise it would remain obscure to what extent significant structural differences in the frames of reference originate from a genuine cultural difference or from historical developments that may occur transculturally. In contrast to strong cultural-relativistic approaches, it will be demonstrated how a comparative cross-cultural analysis can be

grounded on hermeneutic reconstructionism based on the rational reconstruction of the development of classificatory cognition, which seems to follow, at least in some respect, an invariant sequence across cultures.

Chapter Six, *Case Study II: The Interdisciplinary* Integrative Levels Classification, applies the cognitive-developmental approach to context representation in a particular knowledge organization system. The example of the *Integrative Levels Classification* (ILC) is chosen because it is an ongoing research project that presents one of the most ambitious attempts to express multiple viewpoints or authorial perspectives within a knowledge organization system that is intended to serve interdisciplinary purposes (Szostak 2015; Szostak, Gnoli, and López-Huertas 2016; Gnoli 2020a). Additionally, the phenomenon-based facet-analytical approach of the ILC already uses the organizing principle of integrative levels for its basic schema. At the current phase, its application is limited to the ontological dimension of phenomena or subject matters of document but offers a promising point of departure for a complementary application to the epistemological dimension of perspectives or context features of documents in terms of Integrative Levels of Knowing. In contrast to *ad hoc* solutions to context representation based on mere listings of terms that largely lack a systematic organization, it will be shown that the proposed cognitive-developmental approach to knowledge organization based on formal-pragmatic distinctions offers two novel organizing principles, namely, the Integral Methodological Pluralism for a classification of methods or methodologies, as well as the Integrative Levels of Knowing for a classification of viewpoints or epistemic outlooks. This case study will provide some suggestions for their implementation in the *Integrative Levels Classification*.

Finally, the conclusion chapter summarizes the findings of this study and establishes a third alternative solution to the challenge of epistemic pluralism besides an epistemic absolutism naively claiming universal validity of its own standards and an epistemic relativism

abandoning the attempt to organize multiple perspectives in a systematic way. After discussing the limitations of the proposed cognitive-developmental approach to knowledge organization, this dissertation will close with a brief outline of new questions for future research.

2 KNOWLEDGE ORGANIZATION AND EPISTEMIC PLURALISM

2.1 Theoretical Foundations of Knowledge Organization

2.1.1 Knowledge Organization in Library and Information Science

There are many ways in which human knowledge can be organized systematically. A library arranges books on shelves. A university distinguishes faculties and fields of research. An individual mind categorizes perceptions of the environment. A natural language classifies things from everyday life. In the most general sense, the organization of knowledge is as old as knowledge itself and can be found in one form or another in all cultures and at all times (Dahlberg 1974; Bowker and Star 2000).

This section provides an overview of knowledge organization as a field of research in order to locate the point of departure of the present study. As initial orientation, Birger Hjørland (2008b) distinguishes a narrower and a broader meaning of the term *knowledge organization*. In the broader sense, it means the social and cognitive organization of knowledge. While the *social organization* is concerned with the division of mental labor in a given society according to systems of professions or public media, the intellectual or *cognitive organization* deals with the uncovering of structures of reality, as presented by organization systems like the periodic table of chemical elements or biological taxonomies of life forms. From this perspective, knowledge organization is a highly interdisciplinary field in which single sciences, metaphysics, and the sociology of knowledge play a central role. In the narrower sense, knowledge organization is a subdiscipline of library and information science (LIS) mainly concerned with the construction of knowledge organization systems (e.g., subject headings, classifications, thesauri, formal ontologies) and their application as documentary languages for the description of information resources. The main purpose of KOSs is to offer users of information systems an orienting guide and a mean for information retrieval in the form of a controlled vocabulary for document

indexing, particularly, in relation to document collections held by memory institutions, such as libraries, museums, galleries, and archives. Hjørland (2008b) concludes that knowledge organization in the narrower sense cannot be fruitfully developed without considering knowledge organization in the broader sense.

In line with this conclusion, the present study adopts a LIS perspective on knowledge organization with a focus on the epistemological dimension but not without taking further knowledge-related fields of research into account, most importantly, the cognitive sciences including psychology, sociology, anthropology, linguistics, neuroscience, and philosophy. Such an interdisciplinary character of KO research is also emphasized by other LIS authors. For example, Ingetraut Dahlberg (2014a; 2014b) argues for an emancipation of the field of knowledge organization from librarianship and documentation towards a kind of science of science or metascience. Likewise, Robert J. Glushko (2013, 1) seeks to establish a genuine "discipline of organizing" in which organization systems from library and information science are related to organization systems from other research fields like cognitive science, systems analysis, or computer science.

Library and information science is basically the study of information systems and the processes of collecting, organizing, indexing, searching, and retrieving documents or information resources, which is why the most important subdisciplines of LIS are considered to be knowledge organization and information retrieval (Anderson 1996; Saumure and Shiri 2008; Pattuelli 2010; Stock and Stock 2013). While information retrieval (IR) is mainly concerned with optimal computer-assisted strategies for searching and assessing documents or their representations, knowledge organization is primarily about assigning index terms or metadata to information resources based on controlled vocabularies in order to support tasks of information retrieval (Broughton et al. 2005).

The field of knowledge organization is often called “information organization” (Svenonius 2000, 1; Taylor and Joudrey 2018, 1), whereas information retrieval is sometimes referred to as “knowledge retrieval” (Kemp 1988, 1; Martin and Eklund 2000, 18; Zins 2006, 458). Obviously, there seems to be a lack of terminological consensus regarding the basic units of organization or retrieval. Technical terms like *information resource*, *knowledge organization system*, or *metadata* are all related to the same process of document indexing but without sufficient discrimination of core concepts like *information*, *knowledge*, or *data*.

A popular reference model for a conceptual clarification is presented by the so-called knowledge pyramid or DIKW hierarchy that presents levels of increasing complexity from data to information (processed data) to knowledge (meaningful information) to wisdom (applied knowledge). But as noted by Jennifer Rowley (2007) and Martin Frické (2009), there has been limited theoretical discussion of this model that seems to be based on problematic positivistic assumptions. In particular, it suggests that data—from Latin *datum* “the given”—at the most fundamental level can be considered to be neutral and objective, whereas the context factor comes into play not before the levels of processing, meaning attribution, and application. In the philosophy of science, such a positivistic assumption is criticized as the “myth of the given,” a phrase coined by Winfrid Sellars (1956, 267) to emphasize that even data are generated in and influences by a given epistemic context and thus need to be considered in an interpretive way (cp. Rorty 1979; Habermas 2003b; Hjørland 2004).

A more context-aware attempt to disambiguate core concepts of knowledge organization is provided by Michael K. Buckland’s (1991b) typology of information concepts that relates tangible and intangible aspects to entities and processes (see Table 2.1).

Table 2.1 Four aspects of information.

	Intangible	Tangible
Entity	Information-as-knowledge Knowledge	Information-as-thing Data, document, recorded knowledge
Process	Information-as-process Becoming informed	Information processing Data processing, document processing, knowledge engineering

Source: Buckland (1991b, 6: Table 1.1).

One advantage of this typology is that it is based on two clear-cut distinctions that are in line with common language use and definitions provided by standard dictionaries. For example, Buckland (1991a) refers to the *Oxford English Dictionary* in order to define *information-as-process* as the act of informing or the communication of knowledge, *information-as-knowledge* as the knowledge communicated with reference to particular facts or subjects or events, *information-as-thing* as objects like data or documents, and *information processing* as machine-based symbol manipulation. Another advantage is that data and knowledge are considered to be complementary aspects of information rather than different hierarchical levels. This allows to consider any kind of information to be situational in the sense that the informativeness of an object, document, datum, or event depends on the contextual conditions that also involve subjective judgement and social consensus.

According to Buckland (1991a), information systems can deal directly with information only in the sense of information-as-thing in tangible form (e.g., sign, signal, data, text, film). Following this line of argument, Arlene Taylor and Daniel Joudrey (2018, 6) prefer the term *information organization* for the research field since only information as recorded knowledge "can be placed into a scheme of organization from which it can be retrieved." In opposition, Hjørland (2012b) argues that the term "knowledge organization" appears to be more appropriate since the field is primarily concerned with subjects, concepts, and semantic relations

between concepts, that is, information-as-knowledge in intangible form (e.g., ideas, units of thought, language games).

As the subtitle of the present dissertation already suggests, the term *knowledge organization* will be preferred in this study based on two main reasons. The first reason is that there is already a well-established use of terminology beginning with library scientist Henry E. Bliss (1929; 1933) and the phrase "the organization of knowledge" in two titles of his books, which is explicitly adopted for the name of the International Society of Knowledge Organization (ISKO) and the corresponding scientific journal *Knowledge Organization* (Dahlberg 2014b; Kleineberg 2015). The second and more important reason is that the present study assumes that any information-as-thing cannot be adequately understood without considering the context of meaning production that is related to the pre-understanding of communicative actors involved in knowledge exchange or information interaction and thus to the intangible aspects of both information-as-knowledge and information-as-process. In this regard, Buckland (1991a) emphasizes that disciplines like cognitive psychology and studies of interpersonal communication and persuasion play a major role and that it could be more important *how* beliefs change (information-as-process) than *which* beliefs change (information-as-knowledge).

In an elaboration of Buckland's typology of information concepts, Søren Brier (1996, 334) reformulates this important aspect of information-as-process simply as "Cognition" denoting the meaningful interpretation of signs. Since the proposed cognitive-developmental approach is concerned with an organization of epistemic contexts or frames of reference, it will focus primarily on the intangible processes of knowing and learning or becoming informed (information-as-process), in sharp contrast to the mere mechanistic symbol manipulation of machines (information processing). This distinction is also stressed by Brier (2000, 434):

> I use the term knowing because it is the process of creating viable knowledge from combining experiences in a way that is beyond classical logic and that seems to set human

knowledge apart from computers. Our cognitive processes still seem to have features beyond any algorithmic model or mechanism.

In order to avoid an objectivistic understanding of information as a product that can be stored in finished form, the notion of *knowing* refers to the cognitive processes of human actors that take place in given contexts and include, among other things, declarative knowledge or *knowing that* and procedural knowledge or *knowing how* (Biggs 1992). Since the latter form of knowing is often only intuitive and implicit, an adequate understanding of information interaction needs also to consider what Brier (2000, 435) calls the "inner life," which requires a phenomenological description of perceptions and emotions. In a similar way, John Budd (2001, 249) argues for a phenomenological approach to LIS research that takes the "cognitive elements of experience" into account. In this respect, the term "cognition"—from Latin *cognitio-* derived from *cognoscere* "to get to know" or "recognize"—also refers to the process character of human knowing and will be explored in more detail in Chapter Four.

The principal actors involved in information systems like a library or a resource discovery system are authors as producers of documents, information professionals as intermediaries (e.g., classificationists, thesauri constructors, indexers, system designers), and users as consumers, corresponding to the phases of knowledge production, knowledge intermediating, and knowledge consumption (Hjørland 2003). Unsurprisingly, different theoretical and methodological approaches to knowledge organization tend to emphasize different aspects of information systems and processes, as a short historical outline of the field illustrates (see Table 2.2).

Table 2.2 Basic approaches to knowledge organization.

Approach	Characteristics	Unit of organization
Enumerated classification	*Since 19th century*: No evident theoretical approach. It probably represents a rationalization of library work. Examples: DDC, UDC, LCC.	Concretely, documents are the units organized, but the term "knowledge" implies a more abstract ambition to base classification on scientific and scholarly knowledge.
Faceted classification	*Since 1930s*: Analytico-synthetic methodology based on logical principles: Breaking down each subject into basic concepts and combining the relevant units and concepts to describe the subject matter. Examples: PMEST formula, BC2.	"Ideas". This approach removes itself somewhat from the empirical basis of documents and introduces logical principles for KO which are mainly based on rational intuition.
Information retrieval	*Since 1950s*: Free-text retrieval: The assumption that texts contain all necessary information needed to retrieve them. Generally skeptical of all forms of human interpretation, indexing, and classification. Examples: Cranfield experiments, TREC.	Concretely, words, co-word relations, and word-document relations are the units. However, "information" is the claimed unit.
Bibliometrics	*Since 1960s*: Primarily based on using bibliographical references to organize networks of papers, mainly by bibliographic coupling and co-citation analysis. Example: Bibliometric maps.	Documents and citation patterns between documents.
User studies	*Since 1970s*: Systems designed on the basis of user studies and cognitive studies. Relevance is not evaluated by subject experts but by users. Example: Pejtersen's "The Bookhouse" study.	Individual, cognitive structures.
Domain analysis	*Since 1990s*: Knowledge organizing systems and processes are understood from a study of the domain that is being organized, mainly by studying the actors in the domain (sociologically) and the theoretical assumptions put forward by these actors (epistemologically). Examples: Ørom's study of the domain of art, Abraham's study of the domain of music.	"Knowledge" is replaced with "knowledge claims" (documented knowledge claims) or works. (What is organized are not eternal truths, but works with claims which are substantiated from one or another epistemological perspective).

Source: Based on Broughton et al. (2005, 141) and Hjørland (2008b).

For the present study, the question of interest is in which way these different KO approaches are able to deal with the context factor and the various perspectives of the actors participating in information interaction. Therefore, a short discussion of these basic approaches is intended to

show to which already existing ones the proposed cognitive-developmental approach may contribute most fruitfully.

Since the establishment of library science in the 19th century, the *approach of enumerative classification*, culminating in universal systems like the influential *Dewey Decimal Classification* (DDC), *Universal Decimal Classification* (UDC), and *Library of Congress Classification* (LCC), appears to be more oriented on practical requirements of library work than on theory-building in the field of knowledge organization. Even though often unreflected, the prevailing theory of knowledge related to the enumerated classification approach is based on a scientific realism reflecting the contemporary view before the interpretive turn in the philosophy of science (Mai 2011). For example, representatives like Charles A. Cutter, Ernest C. Richardson, and Henry E. Bliss more or less agree that library classification should be oriented on scientific classification which, in turn, is supposed to reflect the natural order of reality as neutral and objective as possible (Hjørland 2008b). This is what Jens-Erik Mai (2011, 711) calls a realistic view based on a "modern monistic ontology," in contrast to a postmodern or "late-modern pluralistic epistemological foundation." Apparently, context-specific aspects or the multiple perspectives of authors, indexers, and users play, if at all, only a minor role and are not approached in a systematic way.

Mathematician and classification theorist Shiyali R. Ranganathan (1989) argues that enumerative classification schemes have a superficial foundation and are not able to anticipate the discovery of new knowledge since the universe of current knowledge presents actually a dynamical continuum with ever-growing branches. Instead, he proposes a new *approach of faceted classification* based on the so-called analytico-synthetic technique consisting of two main steps. In the first step, the *analysis*, the subject matter of a document will be broken down into basic concepts according to a given set of aspects or facets like Raganathan's PMEST formula (Personality, Matter, Energy, Space, and Time) within his *Colon Classification* (CC), whereas in the

second step, the *synthesis*, these different basic concepts will be combined in a classification notation according to a predefined citation order. The strength of such a faceted classification is seen in the stable structure of facets that allows to express different and even unforeseen aspects of knowledge in a highly flexible way. This might include a broad range of context information about documents, for example, the theories and methods applied by the authors (Szostak 2004; Dahlberg 2008; Gnoli 2008a; Szostak, Gnoli, and López-Huertas 2016). But as criticized by Hjørland (2013a), the weakness of the facet-analytical approach is its problematic assumption that basic concepts do not change their meaning in different contexts, as if they were pure logical and *a priori* semantic units.

The *approach of information retrieval* is commonly distinguished from knowledge organization activities but Vanda Broughton et al. (2005), as well as Hjørland (2008b), consider techniques of information retrieval, at least to some extent, as a genuine KO approach due to the fact that they share the same goal to enable users to find relevant information resources. The basic units of organization in information retrieval are words and their relations to other words or documents (e.g., term frequency or co-occurrence). Although often highly effective for search strategies in large-scale text collections, it should be noted that words are primarily considered as mere strings of characters regardless of their meaning and the context in which they are used. More recent IR approaches seek to include these dimensions as well, for example, by using semantic-web technologies like formal ontologies (Rajasurya et al. 2012), by modeling the cognitive space of actors in information interaction (Ingwersen and Järvelin 2005), or by acknowledging insights from the philosophy of language (Blair 2003; Petras 2006). Indeed, the appearance of powerful search engines like Google and Bing based on IR algorithms may call into question the value of knowledge organization systems in the digital age. But as argued by Ullah et al. (2017), bibliographic classifications like the traditional DDC, UDC, and LCC, as well as more modern ones created genuinely for digital environments like the digital library of the Association

of Computing Machinery (ACM) or the cooperative catalog WorldCat of the Online Computer Library Center (OCLC) can still play a significant role for information retrieval, in particular, by providing conceptual relations of classes for the development of formal ontologies. Furthermore, Hjørland (2012a) argues that KOSs like classifications and formal ontologies should function as evaluation systems for the relevance of IR search results. For example, the retrieval of medical documents would benefit from a classification that is based on scientific criteria, such as a hierarchy of research methods according to their degree of evidence-based practice.

The *approach of bibliometrics* is mainly concerned with citation patterns between documents, often in a purely quantitative way regardless of the degree of thematic relevance or the reason for citation (e.g., best-practices, negative examples, counterarguments, outdated views, self-citation). Even though bibliometric or, more generally, informetric mappings are able to visualize social relations and the impact of publication activities within and across discourse communities, and thus certain pragmatic aspects of scholarly communication (Smiraglia 2014), the approach of bibliometrics largely disregards the context factor.

Compared to the aforementioned KO traditions, the *approach of user studies*, often referred to as cognitive studies, appears to be much more context-aware since the relevance of information resources and the design of information systems is related to specific users or user groups with their particular information needs and information behavior. However, this approach is criticized for preferring the user's perspective over the perspective of subject experts, for relying on the individual or average user, and for presuming a universal model of the human mind regardless of social or cultural influences (Hjørland 2013c).

The emphasis on the collective aspect of epistemic communities characterizes the *approach of domain analysis* which studies the actors in a given knowledge domain from a sociological perspective, as well as from an epistemological perspective concerned with the theoretical assumptions put forward by these actors (Hjørland and Albrechtsen 1995). More

than any other KO approach domain analysis emphasizes the importance to investigate different epistemic contexts or frames of references (e.g., epistemologies, paradigms, language games, collective views) and to reflect their implications for relevance criteria, information needs, and the organization of knowledge. According to Broughton et al. (2005), the domain-analytical approach belongs to the same broader theoretical family as semiotic, critical-hermeneutic, or discourse-analytical approaches to knowledge organization.

While all the presented basic approaches to knowledge organization are still important today, a chronological perspective on theory-building seems to reveal a trend towards an increasing context-awareness regarding information systems and processes. For the present study, the most recent approaches of user studies and domain analysis appear to be the most fruitful points of departure for an analysis of the context factor in knowledge organization.

The historical trend of an increasing context-awareness seems to be also reflected by the history of broader paradigms or metatheories in LIS research, which in turn is influenced by more general scientific and philosophical developments (Šamurin 1977; Mai 1999; Ørom 2000; Hjørland 2000; Brier 2008). Since theories of knowledge organization are explicitly or implicitly based on theories of knowledge or epistemologies it appears to be necessary to have a closer look at various epistemological positions that can be found in KO research. In order to reduce complexity, Hjørland (2013b) offers a useful typology of four fundamental theories of knowledge (see Table 2.3).

Table 2.3 Simplified relevance criteria in four epistemological schools.

Empiricism	Rationalism	Historicism	Pragmatism/activity theory
Relevant: Observations, sense data. Induction from collections of observational data. Intersubjectively controlled data.	*Relevant*: Pure thinking, logic, mathematical models, computer modeling, systems of axioms, definitions and theorems.	*Relevant*: Background knowledge about pre-understanding, theories, conceptions, contexts, historical developments and evolutionary perspectives.	*Relevant*: Information about goals and values and consequences both involving the researcher and the object of research (subject and object).
Non-relevant: Speculations, knowledge transmitted from authorities. "Book knowledge" ("reading nature, not books"). Data about the observer's assumptions and preunderstanding.	*Low priority* is given to empirical data because such data must be organized in accordance with principles which cannot come from experience.	*Low priority* is given to decontextualized data of which the meanings cannot be interpreted. Intersubjectively controlled data are often seen as trivia.	*Low priority* (or outright suspicion) is given to claimed value-free or neutral information. For example, feminist epistemology is suspicious about the neutrality of information produced in a male-dominated society.

Source: Hjørland (2013b, 174: Table 1).

The classical epistemological schools of *empiricism* and *rationalism* or their combination in the form of logical positivism or logical empiricism, according to Hjørland (2013b), are still much alive in contemporary KO research but reveal some serious shortcomings. Most importantly, they ignore the fact that knowledge is a social and historical product created to serve certain interests and purposes. Recent theories of knowledge in the philosophy of science are dominated by more context-aware approaches such as *historicism* emphasizing that frames of reference can change over time and *pragmatism* stressing the functional purpose and practical effect of knowledge in given situations.

From a historical perspective, Anders Ørom (2000, 23) subdivides the post-war time of library and information science into at least three main periods, namely, "the physical paradigm, the cognitive view and most recently a tendency towards viewing information institutions and information processes in a social and historical context." The so-called *physical paradigm* presents a realistic view of science and a nomothetic type of research that considers scientific knowledge as universal and neutral, not influenced by social and cognitive processes (Ørom

2000). During the 1970s, a cognitive turn has taken place criticizing this objectivistic understanding as being reductionistic, while emphasizing the importance of cognitive structures or knowledge structures involved in information processes. As argued by Peter Ingwersen (1992, 21), the early *cognitivism* based on rationalistic assumptions and guided by the metaphor of the computer conceiving human beings as information processing devices, should be carefully distinguished from a more elaborate *cognitive view* that refers explicitly to the process of meaning attribution in human cognition:

> In contrast to cognitivism, the cognitive view attempts to model information processing in terms of "categories and concepts" at the level of mainly conscious mental states, implying the property of meaning – not simply as symbol manipulation. As an obvious consequence, machines are not capable of understanding meaning, concept manipulation, thinking, cognition, creativity, etc. except when told or supported by humans.

For Ingwersen (1994b, 102), the cognitive view is much more interested in the pre-understanding of actors and thus related to hermeneutics, which can be associated with Hjørland's epistemology of historicism. According to Ingwersen (1994a), all participating cognitive structures are of potential relevance as a context factor and should be taken into account. The resulting cognitive variety is termed by Ingwersen (1994b, 101) "polyrepresentation" and includes cognitive structures embedded in textual information objects (authors), system designs (mediators), and information needs (users).

In contrast to the methodological individualism favored by the cognitive view focusing on mentalistic or intrapsychological aspects, Birger Hjørland's and Hanne Albrechtsen's (1995) socio-cognitive approach of domain analysis is related to the epistemology of pragmatism or activity theory and prefers a methodological collectivism:

> The domain-analytic paradigm in information science (IS) states that the best way to understand information in IS is to study the knowledge-domains as thought or discourse communities, which are parts of society's division of labor.

In short, the most relevant KO approaches for the present investigation are cognitive studies oriented on the individual dimension of cognitive actors and domain-analytical studies oriented on the collective dimension of epistemic communities since both take epistemic pluralism most seriously and provide the most elaborate tools for an analysis of epistemic contexts. Nevertheless, there seems to be no consensus to what extent individually and socially oriented approaches can be interrelated, as an overview of fundamental metatheories in LIS shows (see Table 2.4).

Table 2.4 Metatheoretical positions in information science.

Metatheory	Constructivism (Cognitive constructivism)		Collectivism (Social constructivism)	Constructionism
Origin of knowledge	Individual creation of knowledge structures and mental models through experience and observation	Individual creation of knowledge structures and mental models; influenced by history and social relationships	Knowledge is social in origin; the individual lives in a world that is physically, socially and subjectively constructed; mutual constitution of the individuals' knowledge structures and the socio-cultural environment	Production of knowledge in ongoing conversations; knowledge and identities are constructed in discourses that categorise the world and bring phenomena into sight
Philosophical influence	Kelly Piaget	Bruner (early work)	Bruner (later work) Vygotsky	Bakhtin Foucault Garfinkel Gergen Wittgenstein (later work) Volosinov
Representatives	Brookes Todd	Belkin Ingwersen Kuhlthau	Hjørland and Albrechtsen Rosenbaum Taylor	Blair Frohmann Given McKenzie Savolainen Talja Tuominen

Source: Talja, Tuominen, and Savolainen (2005, 82: Table I).

Sanna Talja and colleagues (2005) offer a typology of theories of knowledge that focuses on the origin of knowledge. Table 2.4 presents a polarized continuum from purely individually oriented to purely socially oriented approaches that can be found in LIS research. Although one may call into question the assignment of some representatives, for example, Jean Piaget's assignment to a purely individually oriented cognitive constructivism that is not supported by his sociological writings (Piaget 1995; see also Chapman 1988; Lourenço and Machado 1996; Kleineberg 2012), these ideal-typical metatheoretical positions offer an initial orientation. Obviously, the more balanced metatheories can be found in the middle of the spectrum since they seek to take both individual and social aspects into account. On one hand, the right-hand column of *cognitive constructivism*, represented exemplarily by Ingwersen's cognitive view, acknowledges social influences on individual knowledge structures. On the other hand, *social constructivism*, represented exemplarily by Hjørland's and Albrechtsen's domain analysis, concedes that individual knowledge structures and the socio-cultural environment are mutually constituted. Nevertheless, the important methodological difference is stressed again by Hjørland (2002, 258–59):

> In this way socio-cognitive views in many respects turn the cognitive view upside down. They are interested in individual cognition, but approach this from the social context, not from the isolated mind or brain. They are not working inside-out, but outside-in.

In order to avoid any kind of a one-sided approach, Ingwersen's and Järvelin's (2005, 31 [emphasis in original]) so-called holistic cognitive view proposes a more balanced two-sided approach: "This combined bottom-up and top-down view of cognition is named the *principle of complementary social and cognitive influence*." This principle is also adopted by the present study. Despite their differences, *cognitive constructivism* and *social constructivism* should be carefully distinguished from *constructionism* that is explicitly adopted, for example, by Talja et al. (2005) and presents one of the prevailing approaches in LIS discourse today. According to this

view, there is no need at all to take recourse to individual knowledge structures or cognitive activities since knowledge is considered to be determined solely by social conversations within discourse communities.

The methodological implications of these different metatheoretical positions regarding an organization of the epistemological dimension will be discussed in Chapter Three. But first, it should be considered what they have in common, namely, an emphasis on the context-dependent nature of human knowledge.

2.1.2 The Pragmatic Turn

As outlined above, in the last few decades of LIS and KO research significant developments have taken place emphasizing the context factor in the analysis of information systems and processes. This general shift has been labeled differently and will be referred to in this study in semiotic terms as the *pragmatic turn*. Since the communication of knowledge is always symbolically mediated and KOSs as documentary languages present conceptual ordering systems, linguistics as the study of language and semiotics as the study of signs play a central role for an adequate understanding of information interaction in context. According to William J. Hutchins (1975), the study of documentary languages can even be considered to be part of the general study of communication and sign systems. In his linguistic approach, he refers to Charles S. Peirce' semiotics and Ferdinand de Saussure's semiology to distinguish three important aspects for the study of sign systems: the formal aspect, the semantic aspect, and the functional or pragmatic aspect. These are related to the linguistic or semiotic branches known as syntax or syntactics, semantics, and pragmatics.

As outlined by Alon Friedman and Martin Thellefsen (2011), *syntactics* is concerned with grammatical structures and the rules describing well-formed sentences in purely formal terms, *semantics* studies the meaning of linguistic expressions as the relation between signs and their

referents, and *pragmatics* deals with the context in which language is used. Friedman and Thellefsen (2011, 660) conclude that pragmatic relations between signs and sign users are of utmost importance for knowledge organization because "they implicate much more context information, and as such, necessitate a more extensive context analysis of concepts." Accordingly, the diagnosed pragmatic turn in knowledge organization means a shift in emphasis from semantics to pragmatics. The latter includes the sign users' pre-understanding of signs or concepts, which is relative to the social context of interpretive communities. Therefore, Torkild Thellefsen and Martin Thellefsen (2004, 179) describe this shift in knowledge organization as a move from the idea of a universal documentary language to a socio-pragmatic view that relates KOSs to particular discourse communities or knowledge domains:

> The knowledge domain is well defined by a kind of meaningfulness, which organizes knowledge in relation to a particular object field or a certain perspective. Thus, knowledge is dependent upon a viewpoint that creates contextual frames and defines the meaning potential in a given communication.

Other KO authors point in the same direction. For example, Søren Brier (1996, 334) notes that today "the central problems of LIS are socio-pragmatic linguistic," Jack Andersen and Frank Christensen (2001, 2) underline that "indexing theory contains a considerable pragmatic dimension," confirmed by Maria Biagetti's (2006, 243) statement that the "indexing process is really linked to the Pragmatic point of view of semiotics."

Werner Bies (1992, 207) is one of the first theorists calling explicitly for a "pragmatische Wende" (pragmatic turn) in indexing theory from traditional semantics with a narrowed focus on declarative knowledge of facts and subject matters to largely neglected pragmatics with an interest in procedural knowledge of methods, paradigms, problem-solving, and strategies. Pragmatic approaches in linguistics, such as speech act theory, text linguistics, and discourse analysis consider symbolic utterances as actions taking place in given situations. Therefore, the

meaning of linguistic expressions depends on the context-specific use of language and the presuppositions of communication between senders and receivers that include, according to Bies, socio-economic aspects (e.g., role, status, economic situation), socio-cultural and cognitive-intellectual aspects (e.g., text and world knowledge, education, experiences, knowledge of social rules, assumptions about other communicators), psycho-biographical aspects (e.g., motivation, intention, personal disposition, bodily constitution), and linguistic-communicative aspects (e.g., communicative competence, rule knowledge of language games). Furthermore, Bies (1992) emphasizes that pragmatic relations between signs and sign users include both senders (e.g. speakers, authors) and receivers (e.g., listeners, readers) and that indexing theory should both of them take into account.

This distinction is important because *users of signs* should not be equated with *users of information systems*. In KO discourse, these different user concepts tend to be conflated when pragmatic aspects are solely related to users of information system while neglecting other sign users like authors and indexers. For example, Hjørland's (1997, 78) activity-theoretical approach to knowledge organization presents a kind of "pragmatic indexing" that orients itself first and foremost on the purpose of index terms in relation to particular information needs or epistemic interests of user groups of information systems. With reference to Dagobert Soergel, he distinguishes between *content-oriented indexing* describing the subject matter as a mere function of the attributes of the document and need-oriented or *user-oriented indexing* treating the subject matter as a relation between the properties of the document and a real or anticipated user need in terms of an instrumental mean-goal relation. For the latter, Hjørland (2017b, 59) recently prefers the term "policy-based indexing" since it is related to the purpose or given policy of an information system rather than empirical data about users or their requests.

Similar distinctions are made by Raya Fidel (1994) between *document-oriented indexing* and *request-oriented indexing* in which the indexing language is formed by a list of anticipated

user requests, or by Jens-Erik Mai (2005) between *document-centered indexing* and *domain-centered indexing*. Following this understanding, only user/request/policy-oriented or domain-centered approaches are related to pragmatic aspects. Accordingly, Hjørland (1997, 70) criticizes, for example, Derek Langridge's conception of subject matter for not making reference "to the user context, to the pragmatic viewpoint of subject analysis."

But as noted by Hutchins (1975, 111), the "pragmatic influences upon the indexer are by no means the same as those affecting the originator of the text." For the purpose of analysis, one should carefully distinguish between different types of languages involved in information systems and processes including at least the *document language* by the author, the documentary or *indexing language* by the indexer, and the request or *query language* by the user. All of them play an important role in indexing theory and, like any language, all of them can be analyzed according to their formal, semantic, and pragmatic aspects. Therefore, the pragmatic dimension of document indexing is by no means limited to the user's context but also includes the author's context (see Figure 2.1).

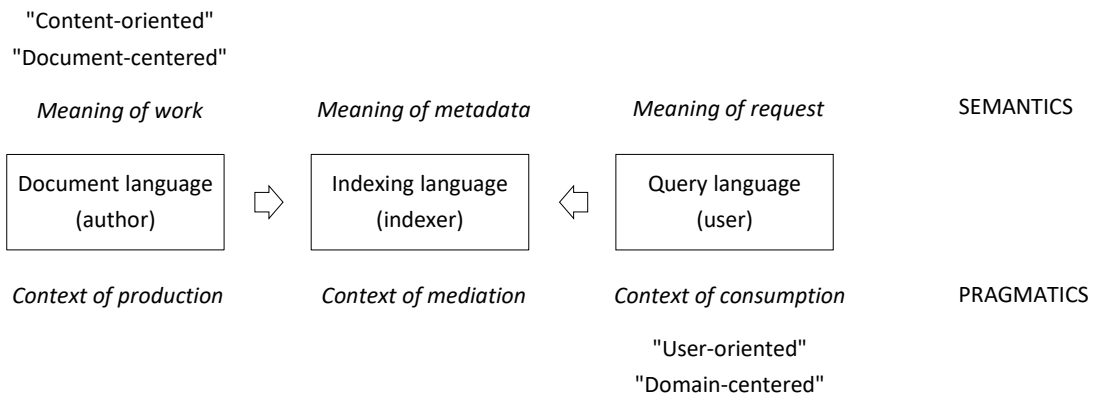

Figure 2.1 Semantic and pragmatic aspects of different languages in information systems.

This means that the pragmatic turn in indexing theory cannot simply be characterized as a shifting focus from the document to the user context (i.e., from the left part to the right part in Figure 2.1) but should be considered as a more general move from semantics analyzing the

meaning of linguistic expressions as mere sentences to pragmatics analyzing the use of language in context (i.e., from the upper part to the lower part in Figure 2.1). In other words, the pragmatic turn should not be restricted to the pragmatic aspects of the query language (context of consumption), as stressed by user-oriented or domain-centered approaches, but should also include pragmatic aspects of the indexing language (context of mediation) and the document language (context of production).

Therefore, the opposition between content-oriented and user-oriented approaches to document indexing appears to be somewhat misleading because from the right premise that text interpretation requires a context analysis of language use, the false conclusion is drawn that the only relevant context is the domain of the user as searcher and reader of documents. This narrowed perspective corresponds to Mai's (2005, 604) reliance on Umberto Eco's "pragmatic aspect of reading" that he summarizes as follows:

> In this understanding of texts and their interpretation, a text does not have meaning in and by itself. The meaning of the text is created by the reader as the text is read and used. [...] When reading a text, a reader will construct an understanding of the text and that understanding is tied to the reader's social context.

What seems to be overlooked in this approach is what one might call the *pragmatic aspect of writing* that refers to the author's social context and the way the author makes use of language. As rightly suggested by Mai (2005), a pure document-centered analysis focusing on the explicit content is insufficient to take implicit context features into account. But this does not mean that a domain-centered analysis should rely exclusively on the reader's context at the expense of the author's context. This would mean to replace one reductionism (document-centrism) with another (user-centrism). Instead, the important insight from hermeneutics should be acknowledged that both the author and the reader can be situated in different contexts, domains, or horizons and that the process of understanding and interpretation is about what

Hans-Georg Gadamer (2013, 415) calls a "fusion of horizons" (*Horizontverschmelzung*). This means a mediation between the reader's pre-understanding and the concepts and ideas of the author that can be assimilated by means of a hermeneutic circle. Even if an interpretation that was correct in itself appears to be a foolish ideal, Gadamer (2013, 415) rejects the assumption that the reader alone determines the meaning of a text: "Being bound by a situation does not mean that the claim to correctness that every interpretation must make is dissolved into the subjective or occasional."

As noted by Wolfgang and Mechthild Stock (2013, 50–61), the hermeneutic task for the indexer (i.e., a reader of document language and query language but also an author of indexing language) would be to fuse her or his own horizon with both the horizon of the original author of the document and the horizon of the searcher or user of the document (i.e., a reader of document language and indexing language but also an author of query language). Therefore, a pragmatically informed document indexing should not be limited to the context of users of information systems but should take all sign user's contexts into account including the indexer's context and the author's context.

This point is also underlined by Andersen's and Christensen's (2001) analysis of the pragmatic dimension in indexing theory with reference to Ludwig Wittgenstein's philosophy of language and his notion of language game as a rule-based social practice. They make a distinction between the author's or document's language game, the indexer's language game, and the user's language game because the underlying contexts of communication are not necessarily the same. From a methodological point of view, Andersen's and Christensen's (2001, 19) argue that the author's language game, which they call the "parent language game," and thus the social context in which a document was originally created should be the starting point of analysis (see Figure 2.2).

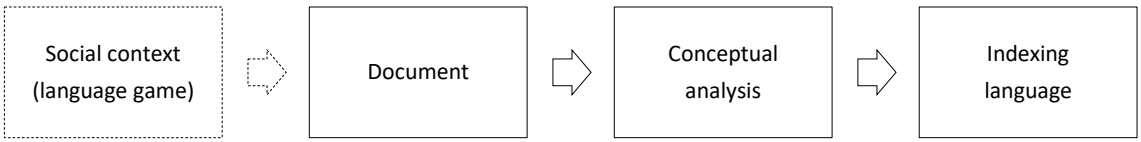

Figure 2.2 Elaborated indexing model and process (based on Andersen and Christensen 2001, 20).

While the traditional indexing process contains two main steps, the interpretation or conceptual analysis of a document's subject matter and the translation of the analyzed subject matter into a controlled vocabulary or indexing language, Andersen's and Christensen's (2001, 20) add a new first step comprising the analysis of the relation between a document and its original social context:

> In an indexing theory we need to understand the language game of a given document in order to predict its potential uses. For example, different theoretical viewpoints present in a document may themselves serve as potentialities which can be of use in other social contexts, i.e. in other language games.

Following this understanding, Hjørland's (1997) critique on Langridge's conception of subject matter needs to be re-evaluated because the latter clearly refers to pragmatic aspects of both the document language or the author's context and the query language or the user's context. Generally, Langridge (1989, 5) distinguishes between "subject analysis" concerned with the thematic content of documents and "enquiry analysis" concerned with the information needs of users and thus with pragmatic aspects related to the context of consumption. Both of them are considered to be important for indexing theory but, like Andersen and Christensen, Langridge's (1989) gives subject analysis methodological priority over enquiry analysis since it is based on the systematic thought of individual writers, whereas searching is a highly situational activity that involves much more uncertainty.

Furthermore, Langridge's (1989, 31) subject analysis makes a distinction between "topic" and "form of knowledge" that points exactly to the semiotic difference between semantic and

pragmatic aspects of the document language or between the know-that and the know-how of the author. While *topics* are related to perceived phenomena, *forms of knowledge* describe the ways in which phenomena are perceived. For Langridge, disciplines or fields of research tend to blur this important distinction and should be broken down into its more fundamental components. For example, the discipline of ethics can be seen as the philosophy (form) of morals (topic), psychology as the science (form) of human behavior (topic), and zoology as the science (form) of animals (topic). Topics are the more obvious features of documents since they are expressed in comparatively concrete terms and easily detectable, for example, through words in the title, abstract, or introduction, while forms of knowledge are more implicit features of documents related to what Bies would call knowledge of methods and paradigms. Compared to the plethora of possible topics, forms of knowledge are considered to be relatively few. Langridge (1989, 24) offers the following list of forms of knowledge:

- Prolegomena: the instruments of knowledge
- Philosophy
- Natural science
- Technology (or Useful arts)
- Human (behavioural or social) science
- Social practice
- History
- Moral knowledge
- Religion
- Art
- Criticism
- Personal experience

To avoid misunderstanding, Langridge's terminology should not be misinterpreted as denoting scientific disciplines or research fields. Instead, terms like *philosophy*, *natural science*, or *history* are meant to indicate different kinds of inquiry or research practices, such as philosophical,

scientific, or historical inquiries. It is also important to note that a topic does not automatically determine the form of knowledge. For example, a simple topic like *milk* can be approached by different forms of knowledge, such as technology, social practice, art, and so on. Moreover, every form of knowledge can also be treated as the topic of a document if it is made an explicit matter of reflection. Therefore, topics and forms of knowledge should be carefully distinguished and analyzed separately in the indexing process.

Langridge (1989, 5) concedes that the term "subject analysis" for the investigation of the significant characteristics of documents is not entirely satisfactory because the word *subject* is ambiguous and often used for more items than any of its definitions would suggest. For example, Langridge (1989, 45) identifies a broad range of "formal characteristics" that include the authorial perspectives of documents in terms of world views of religion and ideology (e.g., Christianity, Marxism), philosophical viewpoints (e.g., rationalism, empiricism, pragmatism, realism, idealism, humanism), schools of thought (e.g., behaviorism and Gestalt school in psychology), epochs (e.g., ancient, medieval, modern), cultures (e.g., Western, Chinese, Indian), intellectual levels (e.g., elementary, advanced), or rhetoric forms of writing (e.g., description, analysis, interpretation, narrative, prescription, evaluation). These formal characteristics are distinguished by Langridge (1989, 45) from the "real subject features" because none of them alters the subject matter of a document, even though they can make a considerable difference in approaching it.

For that reason, the present study proposes a terminological distinction between the traditional *subject analysis* that is concerned with the explicit know-that (i.e., topic, aboutness) of a document and a *context analysis* dealing with the more implicit know-how (e.g., forms of knowledge, methods, viewpoints). This allows distinguishing more clearly between different types of document indexing in relation to semiotic branches (Figure 2.3).

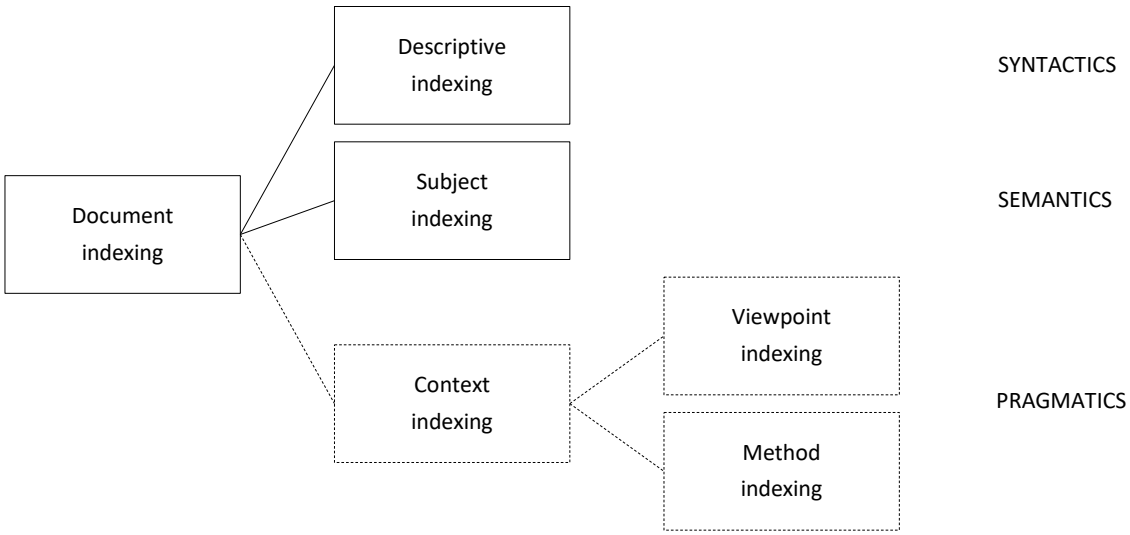

Figure 2.3 Typology of document indexing in relation to semiotics (based on Kleineberg 2013a, 358: Figure 8).

Traditionally, document indexing is divided into descriptive indexing and subject indexing. *Descriptive indexing* deals with attributes that can be more or less directly taken from the document, for example, the features of a book like title and subtitle, name of author, date of publication, publishing house, number of pages, and so on. From a semiotic perspective, descriptive indexing is related to syntactics or Hutchin's formal aspect of language. For example, in the process of cataloging the title of a document is considered only as a string of characters regardless of its meaning and relation to the actual aboutness of the document. The book *The Chrysanthemum and the Sword* by Ruth Benedikt, for instance, has neither flowers nor weapons as its main theme, as the title might suggest, but is concerned with Japanese culture. What matters here is only the formal aspect of the title, even though the rules for a syntactically well-formed language can differ for the document language and the indexing language. For example, the form of heading in indexing languages usually ignores grammatical articles to create an appropriate alphabetical order for an author-title catalog. Likewise, the spelling of foreign names is usually standardized by means of authority files. Such syntactic rules for indexing languages

are defined by standards like the *Anglo-American Cataloguing Rules*, second edition (AACR2) or *Resource Description and Access* (RDA).

By contrast, *subject indexing* is concerned with the meaningful content, theme or aboutness of a document and requires an analysis of its significant concepts (ISO 1985). From a semiotic perspective, subject indexing is related to semantics. In the process of indexing, the subject matter will be determined by a conceptual analysis that identifies significant concepts and their meaning, that is, words or signs in relation to their signified referents like objects, persons, events, or more generally, phenomena. The identified subject matter of the document will then be translated into a controlled vocabulary of an indexing language, regardless of the syntactical structure of the document language. Note that a translation of a document into a different language, say from English to French, does usually not change the semantic aspect but first and foremost the syntactic aspect. Informationally rich documentary or indexing languages based on KOSs as conceptual ordering systems (e.g., classifications, thesauri, formal ontologies) are able to express various semantic relations between concepts or classes, such as hierarchical relations (e.g., genus-species relation, part-whole relation), equivalence relations (e.g., synonymy, quasi-synonymy), or less structured associative relations (i.e., related terms). These semantic relations are explicitly defined by controlled vocabularies for subject indexing, such as the *Library of Congress Classification* or the *Medical Subject Headings* (MeSH).

In this study, however, it will be argued that the traditional division into descriptive indexing and subject indexing is insufficient to take context information, such as Langridge's forms of knowledge (e.g., methods, research practices) and other formal characteristics (e.g., viewpoints, epistemic outlooks) into account. From a semiotic perspective, these more implicit features of documents are neither related to syntactics nor to semantics in a proper sense but to pragmatics and the author's context of meaning production. In order to extend the analytical framework for document indexing, a third kind of indexing tentatively called *context indexing*

will be proposed. Context indexing might be further subdivided into *viewpoint indexing* concerned with the theoretical dimension and *method indexing* concerned with the practical dimension of knowledge production (Kleineberg 2013a; 2014; 2016c).

One advantage of the semiotically oriented framework depicted in Figure 2.3 is to provide an analytical distinction between subject matter (semantics) and context features (pragmatics), which corresponds to similar terminological distinctions that can be found in KO literature (see Table 2.5).

Table 2.5 Terminological distinctions between subject matter and context feature.

Subject matter	Context feature	Reference
Aboutness	Viewpoint	Swift, Winn, and Bramer (1978, 186)
Theme	Viewpoint	ISO (1985)
Content	Viewpoint	Crowe (1986, III)
Topic	Form of knowledge	Langridge (1989, 31)
Propositional content	Illocutionary act	Blair (1992, 200)
Topic	Comment	Bies (1995, 137)
Phenomenon	Approach	Hjørland (1997, 92)
Object	Type of knowledge	Brier (2000, 438, 440)
Content	Point of view	Biagetti (2006, 241)
Phenomenon	Theory and method	Szostak and Gnoli (2008, 203)

Admittedly, semantic and pragmatic aspects are closely related and the opposition between subject matter and context feature does not always present a clear-cut distinction. As already mentioned, an implicit approach or viewpoint (context feature) can be made an explicit theme (subject matter). Furthermore, there is often a conceptual ambiguity of the meaning of basic terms that may signify the subject matter of documents. For example, the term *information* can mean very different things depending on different approaches, such as information theory

considering information as a mathematical definition of statistical probabilities (Shannon and Weaver 1949), cybernetics considering information as a difference which makes a difference (Bateson 2000), documentation theory considering information as data or documents imparting knowledge (Buckland 1991a), and so on. In this regard, Hjørland (2001) is certainly right that subject analysis needs to consider the underlying theoretical views. But even in this case, the proposed terminological distinction between subject matter and context feature seems to be useful since it helps to identify different sources of conceptual ambiguity. On one hand, authors can have different approaches to the same object of interest, which means a difference in terms of context features. On the other hand, authors can use similar terminology but are actually concerned with different objects, which means a difference in terms of subject matter. Taking the example from above, one might easily clarify by means of terminology control that the concept of *information* in information theory and documentation theory refers already semantically to very different things, as it is normally evident from the explicit definitions provided by the authors.

Moreover, a document usually covers several subjects that can be more or less relevant for different user groups with different information needs or epistemic interests. For example, Claire Beghtol (1986, 84) distinguishes between "aboutness" and "meaning" with reference to former distinctions like Robert A. Fairthorne's "extensional aboutness" versus "intensional aboutness" and Bert Boyce's "topicality" versus "informativeness." According to her, *aboutness* indicates the intrinsic subject that is to some extent independent of the use of the document, while *meaning* refers to a more extrinsic subject that depends on the purpose for which a document has been acquired by a library or requested by a user. Another distinction is made by Bella H. Weinberg (1988, 4) between "aboutness" and "aspect" reflecting the linguistic distinctions between *topic* and *comment* or *theme* and *rheme*. For Weinberg, *aboutness* means the actual subject of discourse while *aspect* is related to the new information on a given subject.

In other words, the determination of the semantic content of a document depends to some extent on the pragmatic context in which subject analysis takes place. Therefore, Beghtol (1986, 104) speaks of "contextual relevance" that influences the indexer's subject analysis.

Nevertheless, it will be argued that a pragmatically oriented approach to document indexing should avoid lumping together semantic and pragmatic aspects or the different contexts of production, mediation, and consumption within the traditional framework of subject indexing. The need for a terminological distinction between subject matter and context feature can be illustrated in relation to Hjørland's pragmatic conception of subject matter. In his user-oriented approach, Hjørland (1997, 78) gives a simple example of a cow that can be described in zoological terms as a mammal or in agricultural terms as a domestic animal. He argues that classifying a book on cows according to the subject categories *mammals* or *domestic animals* is independent of the most significant property of the book, which is to have cows as its central theme. Instead, the decision should depend on an evaluation of the usefulness of the book to specific user groups like biologists or farmers. Accordingly, subjects are defined as the "informative potentials" (Hjørland 1997, 86) of documents for future usage. Although such a conception of subject matter is related to pragmatics, it emphasizes the context of consumption while marginalizing the context of production and the pragmatic aspect of the document language. But it is important to note that to describe cows is not the same as to describe a book on cows since the book already presents a description of cows. It makes a difference if the author of the book adopted a zoological or an agricultural approach in the first place, regardless of potential readers or users of the document. Even Hjørland (1997, 86) emphasizes that searchers should be able to identify different theoretical and metatheoretical approaches to a given problem and argues that "the analysis of the implicit or explicit epistemological assumptions in documents forms a central aspect of subject analysis." But this task, which refers to the pragmatic aspect of the document language and the context of production, seems to have no

proper place in the traditional framework of document indexing. To offer such a place is the main motivation for the proposed terminological distinction between subject matter and context feature. Taking the cow example and using the terminology of Langridge, the topic (subject matter) is related to the semantic aspect of the document language and can be identified, in accordance with Hjørland, as *cows*, whereas the form of knowledge (context feature) is related to the pragmatic aspect of the document language and can be identified, for instance, as a *zoological approach* (Langridge's natural science) or an *agricultural approach* (Langridge's technology or useful arts). The decisive point is that this context feature or authorial perspective does neither alter the subject matter of the document nor depends on the user's context or anticipated requests. This allows two important conclusions. First, the document's subject matter and context feature can be analyzed and classified separately. And second, in analogy to Beghtol's (1986, 85) "intrinsic subject," one might also speak of *intrinsic context feature* or intrinsic pragmatic aspects complementary to extrinsic pragmatic aspects, such as user requests or policies of information systems.

These considerations may also shed new light on different conceptions of *subject*, such as the "content-oriented view" and the "request-oriented view" identified by Hjørland (2017b, 59). According to Hjørland (2017b, 59), the *content-oriented view* considers the subject as something inherent in the document that can be determined "objectively," whereas the *request-oriented view* considers subject as something that is attributed to the document in order to serve certain uses and thus determined "subjectively." But the proposed semiotically oriented framework to document indexing shows that a content-oriented view concerned with the document language does not necessarily imply an objective approach to subject analysis since it can also take the context of production and the author's implicit knowledge into account (see Figure 2.1). Accordingly, subject analysis is an act of interpretation and thus nothing that can be done objectively. It requires a hermeneutic circle that involves the subjective horizon or

preunderstanding of both the author and the reader or interpreter. Even though a text can have a variety of interpretations, the interpretive community requires criteria to distinguish between adequate and inadequate interpretations and these criteria can hardly be provided if only the reader determined the meaning of a text. In other words, the content-oriented view and the request-oriented view to subject analysis should be considered as complementary. Hjørland (2017b, 62) is certainly right that the "aim of subject analysis is to identify the most important potentials in order to facilitate the identification of documents that supports important human activities." But this should not prevent indexers to consider both intrinsic and extrinsic aspects of documents. For example, Hjørland (2017b) argues that a library for feminist studies may index a book on Napoleon differently compared to a library for historians because the book can be relevant from a feminist perspective (since it informs about women at the time of Napoleon) and thus this particular perspective should be expressed in the subject representation. But this contextual relevance from a feminist perspective (extrinsic aspect) does not change the fact that a book on Napoleon is about Napoleon (intrinsic aspect). Thus, indexers should take both aspects into consideration, and subject representation might benefit from an internal differentiation between subject matter and context features. It seems also worth noting that there is not always a specific user request or institutional policy but still the need to explicate a subject matter. For example, the Library of Congress Cataloging-in-Publication Data (CIP Data) that can be found on the verso of a book's title page provides a basic bibliographic record containing subject representation independently of the anticipation of specific user interests. This indicates a limitation of a document indexing that relies solely on the request-oriented view to subject analysis.

Thus, the proposed terminological distinctions between subject matter and context feature or between the contexts of production, mediation, and consumption are considered to be useful internal differentiations and analytical tools for any pragmatically informed framework

of document indexing. In particular, these distinctions show the need to take all social contexts or language games involved in information systems and processes into account, including the language game of the author, as methodologically prioritized by Langridge (1989) or Andersen and Christensen (2001), and the language game of the user, as favored by Hjørland (1997) or Mai (2005).

Interestingly, all these KO theorists and many others agree on the importance of Ludwig Wittgenstein's (2010) mature philosophy of language for a pragmatic understanding of document indexing. For Bernd Frohmann (1990, 99), the whole pragmatic turn in the field of knowledge organization can be referred to as the "Wittgenstein shift," which Elaine Svenonius (2004) describes as a move from a referential or picture theory of meaning to an instrumental or contextual theory of meaning. While the former assumes that the meaning of a word is its referent and that knowledge consists of the totality of true propositions corresponding to reality, the latter states that someone knows what a word means when he or she knows how to use it. Wittgenstein is one of the first philosophers who fully acknowledges the performative nature of language. For him, to say something always means to do something, to take part in what he calls a language game, a social practice that is based on public rules and constituted by particular forms of life. In his major work *Philosophical Investigations*, Wittgenstein (2010, 25) summarizes this pragmatic understanding in the famous sentence: "The meaning of a word is its use in language." A decisive consequence for a pragmatically oriented document indexing is pointed out by Andersen and Christensen (2001, 22) in this way:

> An indexing theory based on Philosophical Investigations must divide the universe of knowledge into a number of relatively stable language games, which must be indexed separately.

As initial orientation for such an approach, David C. Blair (1992; 2003) refers to the philosophers John L. Austin and John R. Searle who both elaborate on Wittgenstein's linguistic pragmatics in

a much more systematic way by developing basic typologies of language games or speech acts. A speech act can be defined as an utterance that does not only communicate information but also performs an action, such as promising, ordering, warning, or apologizing. In this regard, Austin (1962) introduces a terminological distinction between *locution* as the literal sentence or propositional content of an utterance, *illocution* or *illocutionary act* as the performed action in the course of an utterance, and *perlocution* as the effect of an utterance on a listener. Blair argues that document indexing should be able to express different kinds of speech acts, presenting Searle's typology of illocutionary acts as an example (John Searle quoted in Blair 2003, 44):

Directives:	In which we order others to do things (e.g., "Get me a Guinness Stout and a bag of chips")
Commissives:	In which we promise to do something (e.g., I'll return the book I borrowed tomorrow.")
Declarations:	In which we bring about changes in the world solely by our utterances—in short, "Saying makes it so" (e.g., "I now pronounce you husband and wife.")
Expressives:	In which we express our personal feelings and attitudes (e.g., "You did a terrific job!")
Assertives:	In which we make statements, truly or falsely, about how things are (e.g., "The Sears Tower is the tallest building in Chicago.")

However, at the current state of the pragmatic turn in knowledge organization and indexing theory, the emphasis seems to be much more on the identification of idiosyncratic contexts than on a systematic organization and interrelation of different contexts within an overarching framework. Therefore, the problem of relativism and its inherent threat of a fragmentation of knowledge occurs that will be addressed in the next section.

2.2 Epistemic Pluralism and the Problem of Relativism

2.2.1 Knowledge Organization in Context: The Incommensurability Thesis

The challenge to cope with epistemic pluralism arises at several dimensions in the field of knowledge organization. The present study is concerned with two of them. The first dimension is related to *knowledge organization in context* referring to the fact that knowledge organization systems like classifications, thesauri, and formal ontologies are by no means neutral representations of reality but culturally and historically embedded human artifacts that serve a given purpose (Mai 2004; Hjørland 2018a). The second dimension is related to *context in knowledge organization* referring to the context representation in document indexing that goes beyond the traditional subject representation in that it takes the "authorial perspectives" of documents into account, such as underlying theories, methodological approaches, and epistemic outlooks (Gnoli 2011; Szostak 2014). In the following, it will be argued that both dimensions of KO research require adequate tools of context analysis in order to avoid the pitfalls of relativism.

The assumption that there are always multiple perspectives available on a given phenomenon or concept implies that even the idea of epistemic pluralism can be conceptualized from multiple perspectives. In the present study, the term "epistemic pluralism" is adopted from Kaipainen's and Hautmäki's (2011, 503) proposal of a multi-perspective knowledge organization and used as an umbrella term for various approaches emphasizing the multiplicity of epistemic contexts or frames of reference, as expressed by notions like Ingwersen's (1994b, 101) "polyrepresentation," Jacob's (2000, 16) "pluralistic universe," García Gutiérrez's (2011, 5) "logical pluralism," Mai's (2011, 723) "epistemological pluralism," or Huertas-López's (2013, 400) "multidimensional knowledge."

The term *epistemic*—from Greek *episteme* "knowledge" or "science"—means relating to knowledge, the conditions for acquiring it, or the degree of its validation. Technically, there is a

terminological distinction between *epistemic* referring to knowledge itself and *epistemological* referring to the study of knowledge, although neither in philosophy nor in KO discourse these meanings are always clearly separated. Epistemology or the study of knowing is commonly distinguished from ontology or the study of being, a conceptual opposition that is well established in KO discourse (Hjørland and Hartel 2003; Gnoli 2012; Kleineberg 2013a). Note that *ontology* as a field of study and subdiscipline of philosophy should not be confused with the same term used in LIS or computer science denoting a documentary language related to semantic web technologies, which in this study will be termed *formal ontology*. While the ontological dimension is related to what knowledge is about or to entities or phenomena someone is *looking at*, the epistemological dimension refers to the way in which knowledge is constituted and influenced by the frame of reference or the lens someone is *looking through*. In classification research, Mai (2011, 711) describes the role of ontology and epistemology as follows:

> This paper traces and interrogates the shift from classification-as-ontology, in which everything is defined as it is, to a more contemporary notion of classification-as-epistemology, in which everything is interpreted as it could be—or more precisely, the paper argues for a conceptual move from modern monistic ontology to late-modern pluralistic epistemological foundation for classification theory and practice.

Based on the assumption that any fact can have multiple interpretations, he argues that the way the world is understood and the knowledge of the world is organized depends on the worldview of the classificationist. The Wittgensteinian notion of *world picture* (*Weltbild*) is characterized by Mai (1998, 239) as follows:

1. Our world picture is closely related to our praxis.
2. Our world picture rest neither on empirical knowledge nor on verifications of hypotheses.

3. Our world picture is not easily changed due to empirical information which contradicts our world picture.
4. A shift in world picture will be similar to a conversion—a fundamental change in the view of the world.

The divergent perspectives before and after such a fundamental change of worldview is often associated with the thesis of incommensurability—from Latin *incommensurabilis* derived from *in-* "not, opposite of, without" and *com-* "together" and *mensurabilis "*measurable*"* or *mensurare* "to measure"—coined by philosophers of science Thomas S. Kuhn (1970) and Paul Feyerabend (1975). This thesis claims that theories related to different frames of reference, such as worldviews or paradigms have no common measure for comparison and that significant concepts and statements cannot be translated without remainder and loss. The assumed incommensurability of frames of reference is often used as an argument that epistemic pluralism implies epistemic relativism (Rorty 1979; Foucault 1981; Jacob 2000; Mai 2004; Talja, Tuominen, and Savolainen 2005). For the construction and application of knowledge organization systems in different epistemic contexts, the thesis of incommensurability points to the challenge of conceptual interoperability and the impending problem of a fragmentation of knowledge into isolated knowledge domains and untranslatable documentary languages.

Interestingly, a fundamental change of worldview seems also to take place in the history of KO theory itself, as ascertained by Mai (1999; 2004; 2011) as a move from modern to late-modern or postmodern approaches, indicated by a shifting focus in classification research from systems and techniques to contexts and domains in which KOSs are created and used. While *modern classification theory* seeks to represent the universe of knowledge by the attempt to create a single best classification system for everyone and everywhere, *postmodern classification theory* aims to provide a pragmatic tool for specific needs that are situated in social contexts.

The latter acknowledges that the act of classification is inherently political and value-laden since it is relative to the epistemic activities of a given knowledge domain.

In Mai's (1999; 2011) critique of modern classification theories from the 19th and early 20th century, as represented, among others, by the work of Melvil Dewey, Henry E. Bliss, Shiyali R. Ranganathan, Ernest C. Richardson, and W. C. Berwick Sayers, he identifies the underlying principles of dualism, de-traditionalization, and globalization. *Dualism* means the assumption that the known and the knower can be separated, for example, by considering the content of a document independently from the reader. Likewise, *de-traditionalization* refers to the tendency to represent documents independently from the activities that create and use them, whereas *globalization* stands for the attempt to create consistency across cultures, domains, and languages by standardization.

These three principles are commonly rejected by postmodern classification theories that recognize the "relativistic nature of classifications" (Mai 2004, 39) and criticize the assumption that one classification could be a true representation of knowledge or a truer one than others. Accordingly, truth and facts cannot be validated by objective criteria, which is why Mai (2011, 723) arrives at the following conclusion: "The starting point for understanding classification is one that any object, any document and any domain could be classified from multiple equal correct perspectives."

At this point, epistemic pluralism is in danger to end up in epistemic relativism. If all perspectives were equally correct, none of them could be more or less valid than any others. From an epistemological perspective that takes the validity of knowledge claims into account, such a position would appear problematic since it eventually contradicts itself. If epistemic relativism was true and fundamentally divergent perspectives were equally correct, then it would be forced to acknowledge that an alternative perspective like epistemic absolutism claiming that only one perspective could be true was correct as well. This is a contradiction. But

if epistemic relativism claimed to be a more valid position compared to a position like epistemic absolutism, then it would not be relativistic in the sense that divergent perspectives are equally correct. This is another contradiction. The problem can also be illustrated by Mai's own diagnosis of a shift of perspectives from classification-as-ontology to classification-as-epistemology. If Mai would subscribe to epistemic relativism, then he should assume that the fundamental change from a modern monistic ontology to a postmodern pluralistic epistemology merely presents a shift between equally correct perspectives. But this seems not to be the case since he vehemently criticizes the former from the vantage point of the latter. As noted by Habermas (2001b, 149):

> The assertion of an incommensurability of different paradigms and the "rationalities" peculiar to them is difficult to reconcile with the hypercritical attitude of postmodern theorists themselves.

If someone claimed that her or his own epistemological position or epistemic outlook was more valid than others, then he or she was implicitly abandoning the relativistic assumption that standards of rationality cannot transcend their own context.

Of course, in the field of knowledge organization, the same document can be classified differently according to domain-specific KOSs that serve different policies and purposes to support different user groups. According to the widely accepted epistemic pluralism, this is not at all a controversial issue since different ways of classifying can very well be appropriate for their given contexts. However, it is one thing to claim that there exist multiple perspectives but quite another thing to claim that these perspectives are equally correct or valid. Even domain-specific KOSs may witness fundamental historical changes due to new scientific evidence that presents more convincing validity claims. In other words, for an evaluation of knowledge and multi-perspective knowledge organization the consideration of validity claims should not be abandoned.

This normative question of validity refers to the relation between human knowledge and reality. Mai (2011, 721) offers a useful conceptual opposition between two kinds of realism that he calls "realism$_1$" and "realism$_2$." Both views agree about the intuition that there is a real world outside but while *realism$_1$* assumes that human knowledge, particularly the kind of knowledge generated by the natural sciences, is able to discover how the world really is, *realism$_2$* assumes that human knowledge does not reflect the world as such but presents always a view of the world from a semiotic distance that inevitably involves a kind of interpretation highly dependent on epistemic contexts. This opposition between a monistic ontology of realism$_1$ and a pluralistic epistemology of realism$_2$ seems also to involve different notions of context.

In Brenda Dervin's (2003, 127) chronological overview of conceptions of *context* in the social sciences an opposition, quite similar to Mai's two notions to reality, is proposed regarding the relationship between reality and knowledge or information about reality. According to her, there is a historical development from modern approaches treating context as an analytic factor (e.g., structure, culture, person, situation, action, organization) that can be separated from the object of interest to postmodern approaches treating context as an inextricable surround and a carrier of meaning that to some extent constitutes the object of interest. This stereotypical contrast is depicted in Figure 2.4 and echoed by Talja, Keso and Pietiläinen (1999, 752) as the opposition between "objectified" and "interpretative" approaches to context.

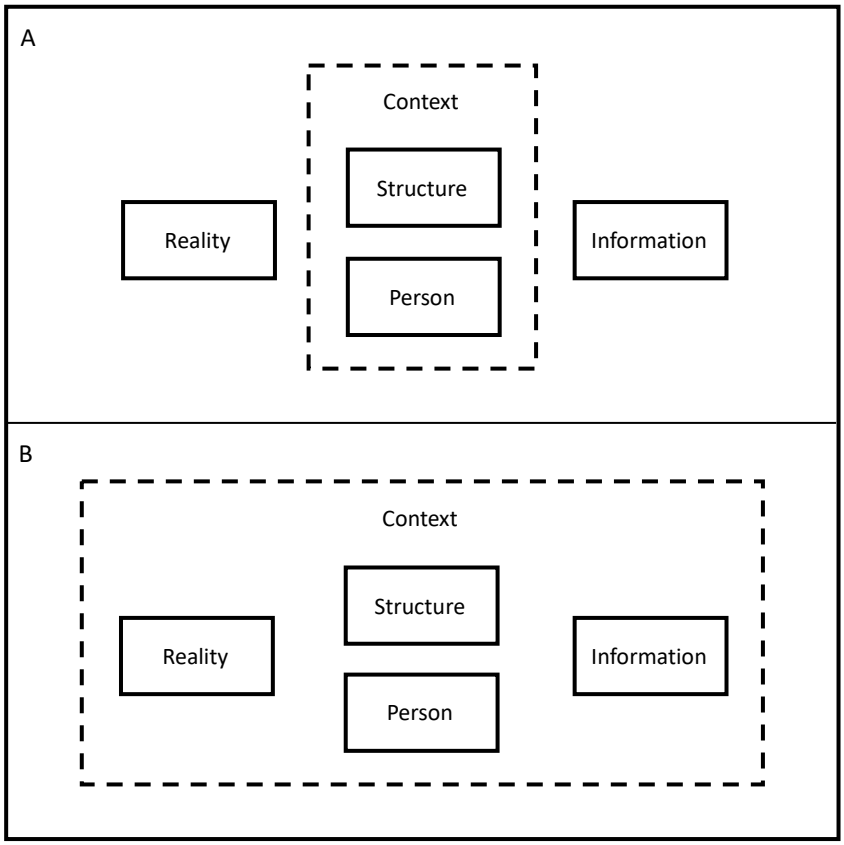

Figure 2.4 Different conceptions of context (modified after Dervin 2003, 127: Figure 7.1).

While in picture A context is presented as a mediator between reality and information, in picture B neither reality nor information exists outside of context. This distinction has important methodological implications for the analysis of contexts. Typical modern approaches (picture A) would aim to identify single context factors and to integrate them into a given analytical framework, whereas typical postmodern approaches (picture B) would reject such an attempt because context factors are considered to be so intertwined that a systematic unraveling appears to be pointless. However, both approaches seem to be insufficient for an adequate context analysis, as Dervin (2003, 130) concludes:

> Admittedly in this discussion I have refused to be cowed by the polarized arguments of either the more postmodern contextualists who see nothing but tyranny in systemati-

> zation, or the more modern contextualists who see nothing but chaos in a fully implemented contextualism.

Instead, she seeks to establish a dialectical position in-between in order to adopt a more balanced multi-method and multi-perspective approach. Nevertheless, she agrees with Jens-Erik Mai and the interpretive turn in the philosophy of science that there is no way back to the essentialist and foundationalist assumption of an external, observer-independent world that merely awaits discovery. Consequently, the objectified notion of context related to monistic ontology needs to be rejected in favor of the interpretive notion of context related to pluralistic epistemology. In absence of any kind of context-free foundation, Dervin (2003, 130) argues that comparisons and contrasts of different frames of reference provide the most promising analytical tools, even though "the infinite regress of context mandates a constant circling in and out of frameworks which becomes in itself methodological guidance."

This means that researchers who fully acknowledge epistemic pluralism should be able to adopt multiple perspectives and to analyze their differences and similarities. At this point, the question arises to what extent divergent frameworks can be compared and interrelated to each other and whether the validity of mutual contradicting knowledge claims can be evaluated across contexts at all. In the following, three influential multi-perspective KO approaches that offer tools for the analysis of different frames of references will be exemplarily examined, namely, polyrepresentation analysis, domain analysis, and genealogical discourse analysis. Each of them focuses on a different aspect of epistemic pluralism, *polyrepresentation analysis* on the cognitive aspect (individual dimension), *domain analysis* on the social or cultural aspect (synchronic collective dimension), and *genealogical discourse analysis* on the historical aspect (diachronic collective dimension). It will be argued that all three approaches fully acknowledge epistemic pluralism but are in danger to lead to epistemic relativism without a more systematic organization of the epistemological dimension.

Polyrepresentation analysis and cognitive relativism

The principle of polyrepresentation is developed by Peter Ingwersen and colleagues (Ingwersen 1992; 1994b; Ingwersen and Järvelin 2005; Larsen, Ingwersen, and Kekäläinen 2006) based on a cognitive approach to information seeking and retrieval in order to improve the intellectual access to documents. According to Ingwersen (1992, 21), the cognitive view seeks to avoid the "reduction of meaning (and pragmatics) into syntax," as presented by traditional IR approaches based on mere symbol manipulation. Ingwersen and Järvelin (2005, 36) distinguish a "syntactical linguistic," a "semantic," and a "pragmatic cognitive" level of analysis and emphasize the importance of the latter for a context-aware approach. The basic assumption is that there is a cognitive variety among individual actors involved in information interaction leading to different representations of the same information object. In other words, epistemic pluralism is specified as cognitive pluralism. The cognitive actors include authors, indexers, algorithmic system designers, interface designers, selectors (e.g., publishers, editors), and searchers or users of information systems. The underlying cognitive structures or knowledge structures, which are also embedded in documents, information system designs, thesaurus structures, search algorithms, or queries, are defined by Ingwersen (1992, 229 [emphasis in original]) in this way:

> The system of categories and concepts which, for an information processing device—whether human or machine—constitutes his/her model of the world, i.e. the *knowledge* of the device. At any point in time, the actual knowledge structures are determined by the individual and its social/collective experiences, education, etc."

Such knowledge structures of cognitive actors are seen as highly dynamic and changeable. In information interaction, the transformation of a present state of knowledge into a new one can either take the form of accumulations of categories and conceptual relations meaning a quantitative change or growth of knowledge, or it can take the form of more fundamental "reconfigurations" (Ingwersen 1994a, 38) that restructure previous knowledge structures and

indicate a qualitative change or growth of knowledge. With reference to cognitive psychologists like Jean Piaget, Lev S. Vygotsky, and Alexander R. Luria, Ingwersen (1992, 43) also distinguishes between mostly conscious "'surface' or 'shallow' knowledge" and mostly non-conscious "deep knowledge." In addition to individual cognitive structures, Ingwersen (1994a, 39) also speaks of "collective cognitive structures" with regard to shared worldviews, social domains, cultural horizons, or scientific paradigms.

Polyrepresentation means the variety of different forms of representations of a given information resource derived from the diversity of pre-suppositions and interpretations by cognitive actors. In particular, Ingwersen (2002, 285) distinguishes between "author, indexer, and user aboutness" which might differ significantly from each other. The principle of polyrepresentation applied to information retrieval is based on the idea of "intentional redundancy" (Ingwersen 1994b, 101) which, in contrast to non-estimated redundancy that is not always productive, seeks to exploit the different cognitive structures involved in information interaction. The underlying hypothesis states that the more cognitive interpretations point to a set of resources in so-called "cognitive overlaps" (Ingwersen and Järvelin 2005, 208), the higher the probability that these resources are relevant or pertinent in a given context of search (see Figure 2.5).

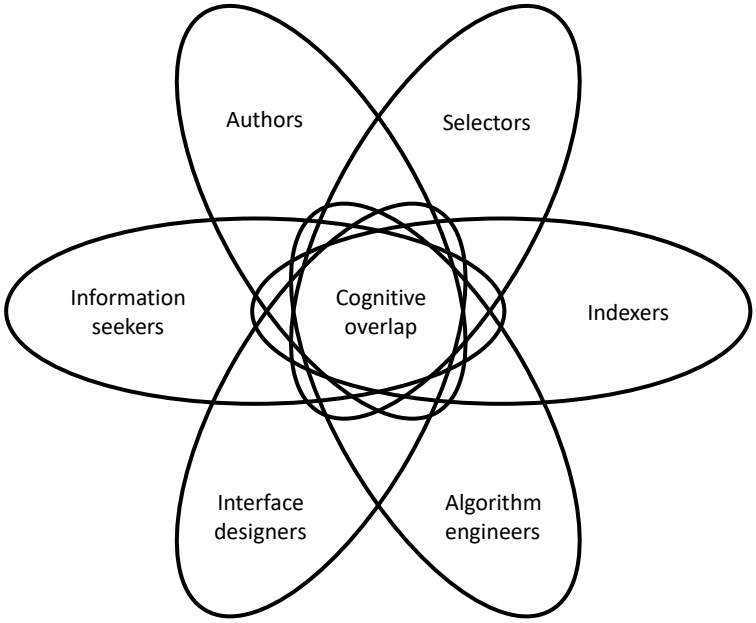

Figure 2.5 Cognitive overlap of different actors in information interaction (modified after Ingwersen and Järvelin 2005, 19, 207).

According to Ingwersen and Järvelin (2005, 30 [emphases in original]), the unavoidable divergence of cognitive representations should be used as an asset in information retrieval:

> The turn into a holistic cognitive view implies a shift *from* believing in the possibility of bringing the variety of cognitive and functionally different structures in IR in harmony, *to* the acceptance that such structures are inherently different, and should be exploited as such.

In this regard, Ingwersen (1994a) argues that different modes of indexing (e.g., author aboutness, indexer aboutness) should be made transparent for the user of information systems in order to cope with the natural variety of language use. Unfortunately, there is not much theorizing about the interrelation and systematic organization of divergent cognitive structures, particularly, regarding so-called deep structures and qualitative differences of frames of references. For example, Ingwersen and Järvelin (2005, 28) refer to Luria's study on the influence of educational background on classificatory behavior and his important distinction between

situational (concrete-associative) and *categorical* (abstract-hierarchical) classification without considering how these different modes of thinking are related to each other in Luria's (1976) cognitive-developmental model, not to mention how the inherent validity claims could be evaluated (cp. Kleineberg 2012). In other words, polyrepresentation analysis fully acknowledges cognitive pluralism but, at the current phase, seems to be in danger to lead to cognitive relativism as one version of epistemic relativism.

Domain analysis and cultural relativism

In contrast to cognitivism or the cognitive view, domain analysis considers library and information science and its subdiscipline knowledge organization as a genuine social science and relies on insights from social psychology, sociolinguistics, sociology of knowledge, and sociology of science in order to study knowledge domains as thought and discourse communities (Hjørland and Albrechtsen 1995). The unit of study is not the individual but what Ingwersen (1994a, 39) calls "collective cognitive structures" related to specialties, disciplines, or domains.

According to Hjørland (2017a), domain analysis as a methodology for knowledge organization can be understood in a broader sense that embraces a range of KO approaches (e.g., user studies, bibliometrics, studies of special classifications or subject gateways, terminological studies, historical studies, critical studies, and studies of scientific communication) and a narrower and more technical sense that is particularly concerned with the epistemological and sociological dimensions of knowledge domains. Following Hjørland and Hartel (2003, 242), *epistemological issues* typically involve:

- approaches
- metatheories
- movements
- paradigms
- philosophies (of discipline X)

- regimes (e.g., treatment regimes)
- schools (of thought and research)
- systems (of thought and research)
- traditions (academic)
- trends (in a field)
- views ("point of views").

These frames of reference are distinguished from *sociological issues*, such as disciplines, discourse communities, or the social system of science. The epistemological and sociological dimensions are closely related and particularly addressed by the family of metatheories commonly referred to as social epistemology (Shera 1973; Fuller 2010; Hartel 2018). Following this understanding, a domain can be defined as a "specialization in the division of cognitive labor that is theoretically coherent or socially institutionalized" (Hjørland 2017a, 439). Although such a socio-cognitive view presents an alternative approach to cognition, it can also be regarded as an integral part of the cognitive sciences in general, in which a kind of "pragmatic turn" (Hjørland 2002, 258; see also Engel et al. 2013) has taken place emphasizing human activities and the role of culture and society for human cognition.

The concept of *domain* in the cognitive sciences refers to the principle of domain-specificity in contrast to domain-general or universal cognitive mechanisms, a dichotomy that also presents a central issue in LIS (Hjørland and Albrechtsen 1995; Hjørland 2017a). For example, as a theoretical foundation for domain analysis, Hjørland and Albrechtsen (1995) reject Jean Piaget's more domain-general approach to cognitive development that emphasizes abstract patterns in favor of Lev S. Vygotsky's more domain-specific approach that stresses the importance of sociocultural contexts. Hjørland's (1997) activity-theoretical approach to knowledge organization, relying on cultural-historical psychology in the tradition of Lev S. Vygotsky, Alexander R. Luria, and Alexei N. Leontiev, as well as on John Dewey's pragmatism,

underlines that subject representation of documents cannot be neutral and general but depends on the purpose of a KOS for a given knowledge domain and its prevailing epistemic interest.

At the same time, Hjørland (1997, 79) concedes that a "danger of the pragmatic viewpoint is a relativistic 'anything goes'" leading to a fragmentation and disorganization of knowledge. He even suggests that interpretive approaches like domain analysis tend to imply a "cultural and domain relativism" (Hjørland 2002, 263). As explicitly stated by Hjørland (2010), different pre-understandings or frames of reference are challenged by Kuhn's thesis of incommensurability.

Furthermore, Hjørland (2002) argues that schools of thought or paradigms (e.g., behavioral, cognitive, psychoanalytic, or neuroscientific schools in psychology) are related to even more fundamental metatheoretical assumptions (e.g., empiricism, rationalism, historicism, or pragmatism) that can also be found in other fields of research. Accordingly, the most promising general framework for a comparison of different knowledge domains would be a systematic overview of epistemological positions. In this respect, Hjørland's proposed typology of four epistemological schools in Table 2.3 presents a very fruitful analytical tool that is well established as a reference model in KO discourse (Smiraglia and Lee 2012a; Gnoli 2020b). For a systematic organization of the epistemological dimension, however, it provides a mere typology instead of a genuine classification, which is to say a term list without conceptual relations like hierarchical subordination, thematic association, or any other underlying principle of organization. Therefore, it is not self-evident how these qualitatively distinct epistemological positions are related to each other and whether one position can be considered to be more valid than others. This appears to be even more difficult given the fact that many metatheories in KO and other fields present rather a mixture of these positions (Dousa and Ibekwe-Sanjuan 2014). Even though Hjørland (2002, 266) himself adopts the position of pragmatism as the most promising epistemology for LIS and KO, he emphasizes that "there is no neutral platform from which the different positions can be evaluated."

Hjørland (2016, 320) argues that the best way to deal with the challenge of interoperability across different knowledge domains, for example, in interdisciplinary research is to consider a KOS as a kind of "boundary object," a term coined by Susan L. Star and James R. Griesemer. A boundary object is both flexible enough to satisfy the information needs of local communities of practice or social worlds and solid enough to maintain a common identity in different contexts. In analogy to Ingwersen's concept of *cognitive overlap*, one might call such a common identity of a boundary object a kind of *socio-cognitive overlap* that comprises the same limitations regarding a systematization of frames of references. In other words, domain analysis fully acknowledges cultural pluralism but, at the current phase, seems to be in danger to lead to cultural relativism as one version of epistemic relativism.

Genealogical discourse analysis and historical relativism

In addition to the methodology of domain analysis that is mainly concerned with social and cultural differences of frames of reference at a given point in time, some KO approaches emphasize the historical nature of these frames and seek to reconstruct their origins and change over time. According to Hjørland (2009, 1527), such approaches are related to the metatheory of historicism: "The ideal of historicism is to define concepts (a) genealogically and (b) by explicating their relations to theories and discourses." One of the most influential historically oriented methodologies in knowledge organization is presented by genealogical discourse analysis inspired by Michel Foucault (Frohmann 1994; Budd and Raber 1996; Olson 2002; Andersen and Skouvig 2006; Martínez-Ávila 2011; Fox 2015). Following Daniel Martínez-Ávila (2011, 108) this approach can be characterized as a kind of critical historiography:

> Foucauldian genealogical discourse analysis thus can be used to reveal the perspective, assumptions and goals that drive the organization of concepts and the development of

knowledge organization systems through the analysis of the continuities/discontinuities in the relations of concepts and practices.

Foucault (1970; 2001) explicitly refuses to establish methodological rules in order to avoid the trap of essentializing his research practice. While this position seems to offer a kind of methodological freedom, it is also in danger to become a trap in itself, as noted by Martínez-Ávila (2011), if researchers omit to explain their methodology in face of the charge of being prescriptive. As an initial orientation, Melodie J. Fox (2015, 63) distinguishes several analytical strategies that are covered by the umbrella term "Foucauldian Discourse Analysis" such as archaeological analysis, genealogical analysis, and self-technology analysis.

Foucault's archaeological analysis, presented in *The Order of Things* (1970) or *The Archaeology of Knowledge* (2004), is concerned with written or spoken utterances of institutionally privileged speakers who raise validity claims of truth. It aims to reconstruct the underlying rule system of discourses constituting so-called epistemes or discursive formations that describe paradigm-like knowledge formations. In the course of history, subsequent discursive formations within a given culture can be distinguished but not as parts of an overarching developmental trend but as historically contingent archaeological strata. With regard to the transformation of epistemes over time, Foucault's (1970) archaeological analysis explicitly rejects explanations and prefers a purely descriptive methodology (cp. Dreyfus and Rabinow 1983; Kleineberg 2013b; Fox 2015).

In contrast, Foucault's genealogical analysis, outlined in *The Order of Discourse* (1981) or *Nietzsche, Genealogy, History* (2001), is much more interested in the underlying epistemic reasoning of historical changes of discursive formations and the conditions that make their appearance possible in the first place. The object of analysis is discursive practices that are embedded in technical, organizational, behavioral, or pedagogical processes and considered to be constituted by a "network of institutional power relations" (Frohmann 1994, 124).

In the field of knowledge organization, genealogical discourse analysis is often applied as a combination of Foucault's archaeological and genealogical analyses, as noted by Martínez-Ávila (2011), since his genealogy cannot be clearly separated from his archaeology and should rather be seen as a natural continuation focusing more on the diachronic dimension and the role of power relations. Its critical stance allows revealing idealizations of dominant groups or cultures as historically contingent constructions that tend to marginalize alternative perspectives and values. For example, Smiraglia, Lee and Olson (2011), use genealogical discourse analysis to examine the epistemic presumptions of the concept of authorship from ancient times to the present in order to understand the contingent nature of current bibliographic conceptions of authorship. Likewise, Fox (2015) investigates the epistemic relation between medical and legal discourses and the classification of sex and gender in the history of the *Dewey Decimal Classification*.

Of particular interest for the study of knowledge organization systems in historical contexts appears to be the critical work of Hope A. Olson that draws heavily on Foucauldian discourse analysis (Olson 1999; 2000; 2002; 2009; 2011). In a review article on Bowker's and Star's *Sorting Things Out*, Olson (2002, 379) applauds the authors for their "archaeological exposure" to contextualize classification practices over time but demands an examination of the origins and "genealogical sources" of the underlying logical patterns in order to question the assumption of the universality of classification. Based on the premise that the current dominant classificatory structures employ a culture-specific logic, Olson's (2002, 390) emancipatorily motivated research seeks to analyze the "cultural construction of classification to understand its often hegemonic effect both within and across cultures."

Olson (1999) identifies exclusivity, teleology, and hierarchy as three basic epistemic presumptions of classificatory thought and formal logic in the Western tradition and traces them back to ancient Greek philosophers like Parmenides, Plato, and Aristotle. *Exclusivity* means that

categories or classes of a knowledge organization system are mutually exclusive or disjoint, *teleology* refers to a linear progression towards a goal as presented by sequences from the most concrete to the most abstract or from the most basic to the most developed, and *hierarchy* is related to logical division and the dominance of some classes over others. Consequently, these structural elements often lead to marginalizing effects that Olson (2009) summarizes as hierarchical force, ghettoization, and diasporization. *Hierarchical force* mandates that what is true of one class is also true for its subclasses. For example, the DDC's placement of gay people under the subclass Homosexuality characterizes them only according to the single characteristic of its superclass Sexual Relation. *Ghettoization* refers to the problem of gathering and isolating a topic instead of integrating it across several main classes, as presented, for example, by the LCC's placement of native Americans as a subclass of American History. Finally, *diasporization* refers to the opposite problem of dispersing groups that share common characteristics because they are classified according to other characteristics. For example, the DDC disaggregates the topics American African Male Youths and American African Middle-Class Women by grouping them according to age or sex in the first place.

As alternative ordering systems, Olson (2002; 2009) refers, among others, to the social classification of the Polynesian Pukapuka culture that seeks to avoid polarizations and tries to balance multiple allegiances, to the symbolic classification of the Chinese Taoist culture that allows overlapping systems (e.g., yin and yang), or to bibliographic classifications of the European medieval and Renaissance culture in which order is based on the criterion of similarity rather than of difference, corresponding to what Foucault (1970) characterizes as the *episteme of resemblance* in contrast to the *episteme of representation*. She concludes that classificatory thought and the way knowledge is organized need to be considered as an integral part of the prevailing ontological and epistemological foundations which differ across cultures and change over time.

From a historical perspective, however, Olson (2000) strongly rejects Emile Durkheim's and Marcel Mauss's assumption of a general development from so-called primitive classifications towards logical classification. In genealogical discourse analysis, not only different cultures but also subsequent discursive formations within a given culture present incommensurable frames of reference since historically contingent discontinuities cannot be related to each other or analyzed within an overarching framework. In other words, genealogical discourse analysis fully acknowledges historical pluralism but, at the current phase, seems to be in danger to lead to historical relativism as one version of epistemic relativism.

2.2.2 Context in Knowledge Organization: The Context-Index Illusion

The problem of epistemic relativism occurs not only when knowledge organization systems and processes are considered in their context but also when context information in terms of authorial perspectives of documents is provided by KOSs. An informationally rich representation of epistemic contexts requires a documentary language that is able to express not only a broad variety of frames of reference but also their interrelations based on a systematic organization of epistemic contexts in general. Under the premise of epistemic relativism, such a systematic attempt to the organization of contexts would be hard to establish since it denies the possibility of an overarching framework that offers context-transcending principles of organization or criteria for an evaluation of validity claims.

In early library science, a quite similar problem already occurs with regard to subject analysis and indexing. In his *The Organization of Knowledge in Libraries and the Subject-Approach to Books*, Henry E. Bliss (1933) argues that a systematic subject approach is required. Any attempt to apply a mere alphabetical subject approach without a systematic organization of the plurality of knowledge subjects in general is rejected by Bliss (1933, 301) as a kind of "subject-index illusion." A mere listing of subjects, as provided by subject headings, would not be able to

meet the principle of maximal efficiency that results from the strategies of *collocation* of thematically related classes or subjects and *subordination* of the specific to the generic. This means that a differentiation (analysis) of subjects should only be considered as a necessary first step which needs to be succeeded by an integration (synthesis) of subjects into a well-structured knowledge organization system, as underlined by Bliss (1933, 104):

> Analytic division tends to dispersion. But synthesis, either collocative or systematic, places subjects in effectual relation and efficient organization. A collocative synthesis does not, however, forego analysis, which inevitably issues from subdivision; but it collocates the results of analytic subdivision. This is the very nature of systematic classification. It opposes the false theory that disorder and dispersion can be obviated or compensated by an alphabetic key or subject-index.

In this section, it will be argued that the same problem of disorder and dispersion also appears with regard to context analysis and indexing. In analogy to what Bliss calls the *subject-index illusion*, one might speak of the *context-index illusion* for any attempt to apply a mere alphabetical context approach without a systematic organization of the plurality of epistemic contexts in general (Kleineberg 2014).

Alphabetical order as an organizing principle for epistemic contexts would be an important first step to create a controlled vocabulary in which terminological issues like synonymy or quasisynonymy are harmonized by means of preferred and non-preferred terms to indicate equivalence relations. The result would be term lists that in analogy to *subject headings* might be called *context headings*. But such unstructured listings of terms, similar to glossaries or dictionaries, present informationally poor documentary languages without basic conceptual relations, such as hierarchy relations and association relations. Consequently, context indexing based on mere term lists tends to disorder and dispersion since this kind of documentary

languages is not able to interrelate different epistemic contexts and to reduce complexity by collocation and subordination.

Therefore, a systematic approach to context representation requires more expressive documentary languages with hierarchy relations and association relations. At this point, the question of relativism becomes crucial because the collocation and subordination of divergent frames of reference depend on the possibility to find criteria for comparison.

In the following, it will be examined to what extent recent KOSs already contribute to a systematic approach to context representation. In *The Organization of Information*, Taylor and Joudrey (2018) identify some content characteristics that need to be distinguished from subject matters because they do not directly affect the aboutness of documents but establish some context for a better understanding of information resources. These content characteristics include research method, point of view, language (e.g., tone, audience, intellectual level), as well as form and genre. Although the authors emphasize the importance of these context features, at least for some specialized purposes, they observe that all of them play only a minor role in the conceptual analysis of documents. With regard to *point of view*, Taylor and Joudrey (2018, 463) conclude:

> This content characteristic, however, is rarely if ever translated into controlled vocabulary terms or classification notations; instead, it may be addressed in summary statements or abstracts.

An early attempt to incorporate viewpoint information in a documentary language is presented by Derek Austin's (1984, 168) *Preserved Context Index System* (PRECIS) by means of the operator "viewpoint-as-form." Operators indicate a role of given elements in the PRECIS thesaurus and this operator distinguishes between viewpoints, perspectives, and aspects. While *viewpoints* refer to classes of people (e.g., Christian viewpoint, Trade union viewpoint) and *perspectives* correspond to disciplines (e.g., sociological perspectives, philosophical perspectives), *aspects* are

not related to the holders of viewpoints but identify facets of the core of a subject in special studies (e.g., economic aspects, social aspects). However, for the adjectival phrase that specifies the viewpoint-as-form, there is no controlled vocabulary available and its denomination remains a decision of the indexer. The only advice given by Austin (1984, 171) is a "policy of deliberate generalization" stating that the viewpoint should be generalized as much as possible. For example, names of specific organizations (e.g., Greenpeace viewpoints) should be avoided and replaced by a more general term (e.g., conservationist viewpoints).

In a similar way, Swift, Winn and Bramer (1978, 186) propose a "multi-modal approach" to document indexing for the social sciences which more than other fields are characterized by divergent frames of reference. In order to group together pieces of research employing a common theoretical orientation or methodological approach, the indexer takes a clearly defined range of viewpoints and generates a title-like phrase for each aspect of the document. These phrases are associated with different dimensions that are organized according to their own set of headings. For example, for the theory dimension headings can represent types of approach (e.g., structural-functionalist), discipleship (e.g., Durkheimian), or content of theory (e.g., socialization). More recently, Biagetti (2006) proposes the following four dimensions for a multi-modal approach: theoretical orientation, method of research, empirical situation under study, and data collected. Alternatively, Gnoli (2012, 271) selected the following "facets of the epistemic dimension" under the label of perspective: epoch, place, method, theory, discipline, culture, activity field or domain, modality, and communicative function. But even if the plurality of viewpoints could be clearly defined, the envisioned documentary languages present mere term lists in form of various headings which, as argued above, are insufficient for a systematic approach to context representation.

In his monograph *Classifying Science: Phenomena, Data, Theory, Method, Practice*, Rick Szostak's (2004) presents a further approach in which a broad range of context features is

incorporated into the faceted structure of a comprehensive phenomenon-based classification that seeks to serve interdisciplinary purposes. Terminologically, Szostak (2015, 64) uses the umbrella term "authorial perspective" for such diverse context features as discipline or field, methods employed, theoretical orientation, ideological outlook, ethical outlook, epistemological outlook, aesthetic outlook, and rhetorical strategies. His approach is guided by five simple W questions (i.e., Who? What? Where? When? Why?) that can be asked at each stage of investigation to structure and identify components of science or scholarship. According to Szostak (2004, 7), one of the main goals for his envisioned classification is to provide "potentially exhaustive lists of phenomena, types of theory, and methods." For example, he argues that the number of research methods is manageably small and can be covered by the following listing (excerpted from Szostak 2004, 101–2):

- experience (including natural or quasi-experiments)
- surveys
- interviews
- mathematical models (and simulations)
- statistical analysis
- ethnographic/observational analysis
- experience/intuition
- textual (content, discourse) analysis
- classification (including evolutionary analysis)
- mapmaking
- hermeneutics/semiotics
- physical traces (as in archaeology)
- evaluation.

Leaving the question of exhaustiveness aside, such a term list of methods presents, again, a documentary language that lacks conceptual relations like collocation and subordination that are indispensable for any systematic account to context representation. Unlike the case of

research methods, it appears to be rather impossible to provide an even nearly exhaustive list of theories due to their ever-growing and dynamic nature. Therefore, Szostak (2004, 52) develops a "typology of theory" based on an application of the five W questions and identifies some generalized theory types that are characterized by agency (e.g., intentional/nonintentional, individual/group), action (e.g., passive/active), decision-making (e.g., intuition/rational), time path (e.g., equilibrium/stochastic), and generalization (e.g., nomothetic/idiographic). Although these generalizations provide a more systematic approach because they apply the strategy of collocation of similar theories, even Szostak (2004, 226) concedes that the subsumption of individual theories to the proposed theory types is often problematic since "different versions of a particular theory fit in different cells of the typology." Moreover, it remains unclear how different theory types are interrelated and in which way they can be compared and evaluated.

Interestingly, this question is discussed with regard to paradigm shifts in the history of science, as investigated by Thomas S. Kuhn. Szostak (2004, 208) argues that when scientific revolutions come, they "often absorb the older paradigm into a newer one." In physics, for example, Einsteinian relativity theory does not simply displace Newtonian mechanics but incorporates its important insights as a special case. Unfortunately, Szostak makes not much use of this consideration for theory-building in knowledge organization. But it seems to be important to note that from this point of view the interrelation of paradigms before and after a paradigm shift can be qualified in terms of both a developmental relation since the older is the precondition for the newer, as well as a hierarchical relation because the newer includes the older as a specification. At the same time, one might argue that knowledge claims raised within the newer and more comprehensive paradigm are likely to be more valid compared to those of the older paradigm. These considerations come very close to the notion of Integrative Levels of Knowing that will be discussed in more detail in Chapter Three.

2.3 Summary

In this chapter, the role of the context factor in the field of knowledge organization is outlined in order to specify the overarching research question addressed by this study. After a pragmatic turn in KO theory, epistemic pluralism is widely accepted and provides the point of departure for theory-building in which the problem of epistemic relativism with its inherent threat of a fragmentation and disorganization of knowledge is identified as one of the most important challenges. Based on a literature review of recent KO approaches, the context factor regarding human knowledge is considered along two analytical dimensions that are concerned with the context of mediation and the context of production.

The first dimension, *knowledge organization in context*, refers to the frame of reference underlying the creation and application of knowledge organization systems. Three of the most elaborate context-analytical methodologies, namely, polyrepresentation analysis, domain analysis, and genealogical discourse analysis are exemplarily investigated with the result that all of them tend to be open for different versions of epistemic relativism. While prevailing context-aware approaches focus on the idiosyncratic nature of epistemic contexts, much less theorizing is provided for their systematic organization. Therefore, the first complex of research questions can be specified in this way: Based on which theoretical and methodological foundations can epistemic pluralism be approached without falling prey to epistemic relativism? Which principles of organization may help to classify epistemic contexts in general? And according to which criteria can divergent epistemic contexts in which knowledge organization takes place be compared to each other and evaluated?

The second dimension, *context in knowledge organization*, is related to document indexing and the representation of epistemic contexts in terms of authorial perspectives. It has been found that the traditional division into descriptive indexing and subject indexing seems to be insufficient for an analysis of epistemic contexts. Therefore, a semiotically oriented

framework for document indexing is proposed that distinguishes more clearly between subject matter and context feature and introduces a genuine context indexing. Currently, most context-analytical approaches to document indexing present mere term lists as a documentary language for context representation since a more systematic approach seems to be theoretically underdeveloped. Therefore, the second complex of research questions can be specified as follows: Based on which theoretical and methodological foundations can a genuine context analysis and indexing be established? Which principles of organization appear to be appropriate to develop an informationally rich documentary language for the representation of epistemic contexts? And how can these organizing principles be applied to already existing knowledge organization systems?

3 ORGANIZING THE EPISTEMOLOGICAL DIMENSION

3.1 Methodological Considerations

3.1.1 Formal Pragmatics and Rational Reconstruction

As outlined in the previous chapter, there is a large measure of agreement that after the pragmatic turn in the field of knowledge organization the cognitive, cultural, and historical contexts of the production, mediation, and consumption of human knowledge are of utmost importance and should be made an explicit matter of reflection. Much less agreement exists, however, about the question to what extent such epistemic contexts can be organized in a systematic way. There is a broad range of pragmatically informed theories and metatheories that present different methodological approaches to context analysis and have different implications regarding the problem of relativism. While recent KO research often takes recourse to relativistic approaches, such as Wittgenstein's linguistic pragmatics or Foucault's analysis of discursive practices, the present study argues that the organization of the epistemological dimension benefits most from a more systematic and non-relativistic approach. In this section, Habermas's universal or formal pragmatics will be introduced as a promising candidate for a theoretical and methodological foundation of context analysis and indexing in knowledge organization.

Some LIS authors note that prevailing context-analytical tools seem to be limited to some extent. For example, Luciana de Souza Gracioso (2012, 66) points out that Wittgenstein's philosophy of language and his concept of language game are important to take the context of language use into account but "his work does not show any theory or methodology." Instead, she refers explicitly to Habermas's formal pragmatics as a more operational approach. Likewise, Janne Backlund (2005, 124) emphasizes that Habermas's Theory of Communicative Action based on formal pragmatics not only heavily relies on the later Wittgenstein but provides a "fully developed and powerful theoretical tool" for context analyses. Furthermore, John Buschmann

(2010, 169) observes that Habermas's critical approach seeks to "overcome the totalizing dead end and aporia of postmodernism," that is, a self-refuting epistemic relativism. In fact, Habermas's formal pragmatics already has a significant impact on LIS and KO discourses (Benoît 1998; Ng 2002; Akkerman 2008; Brier 2008; Budd 2011; Ma 2012; Kleineberg 2016c; 2018).

As a representative of Critical Theory within the second generation of the so-called Frankfurt school, Habermas (2009) characterizes his own work as the attempt to combine a radical historical thinking with the justification of a normative diagnosis of the present. Such a normative element seems to be necessary for any theory of society that aims to identify misguided developments or social pathologies. Therefore, Habermas rejects methodological approaches that abandon normative questions because they lead eventually to different versions of relativism and remain unable to maintain a critical function since they cannot provide analytical tools for an evaluation of validity claims. At the same time, Habermas (1987) acknowledges that early Critical Theory, as represented by Theodor W. Adorno, Max Horkheimer, and to some extent his own writings before *The Christian Gauss Lecture* in 1971, still operates within the conceptual frame of the philosophy of consciousness that appears to be inadequate in face of the significant linguistic turn in philosophy. While early Critical Theory with reliance on Sigmund Freud and Karl Marx seeks to analyze the intra-psychic and collective false consciousness in terms of self-deception or ideology, Habermas takes the linguistic turn seriously and establishes a communicative theory of society within the conceptual frame of the philosophy of language.

In contrast to the philosophy of consciousness or the *mentalist paradigm* with its constitutive concepts of being and appearance reflecting the epistemological relation between a known object and a knowing subject, the philosophy of language or the *linguistic paradigm* emphasizes the intersubjective nature of human knowledge that is always already symbolically mediated. The two-place relation between *subject* and *object* is exchanged by the three-place

relation between a *symbolic expression* claiming validity about a *state of affairs* for an *interpretive community* (Habermas 1987). Consequently, epistemic authority passes over from the knowing subject to the linguistic community. Knowledge can no longer be considered to be based on a correspondence of representations and facts since it cannot be separated from the process of communication between members of a linguistic community coming to a mutual understanding about something. Such linguistic or communication communities constitute frames of reference or interpretive horizons that are highly dependent on sociocultural and historical contexts. Accordingly, Habermas (1987) argues that a reformulation of Critical Theory should replace a critique of ideology or false consciousness (mentalist paradigm) with its functional equivalent of a critique of cultural modernity in terms of communication pathologies (linguistic paradigm).

This fundamental paradigm shift also implies a new form of epistemological doubt regarding truth claims, as concluded by Habermas (2003a, 356): "contextualism is built into the basic concepts of the linguistic paradigm just as skepticism is built into mentalism." In his critique of Richard Rorty's strong contextualist understanding of the pragmatic turn in philosophy that presents a relativistic and anti-realistic version of pragmatism known as neopragmatism, Habermas (2003a, 351) draws an analogy between the methodological choices of the mentalist paradigm and the linguist paradigm:

> Just as Locke and Hume referred their mentalist reflections to the consciousness of empirical persons, Kant referred his to the consciousness of subjects "in general." Linguistic reflections, too, can be referred to communication communities "in general."

This opposition between empirical or particular approaches and general approaches marks Habermas's (2003a, 92) important methodological distinction between "empirical pragmatics" and "universal pragmatics" or "formal pragmatics," as he now prefers to call it in analogy to formal semantics (Habermas 2003a). Just as Immanuel Kant's transcendental analysis of reason

is intended to overcome the epistemological doubt of skepticism, Habermas's formal-pragmatic analysis of communication is intended to overcome the epistemological doubt of contextualism that occurred after the linguistic or pragmatic turn in philosophy and other fields. The basic assumption of contextualism is that the validity of knowledge claims depends on the standards of a particular linguistic community determining what is acceptable as rational. Following this understanding, knowledge is merely a matter of conversation and social practice, while there is no "metapractice" (Rorty 1979) from which all possible social practices can be evaluated. In contrast, Habermas's program of formal pragmatics, which can be considered to be the core of his entire philosophy (Ingram 2010), defends the possibility to establish an overarching framework for the comparison and context-transcending evaluation of knowledge claims.

Habermas (2009) agrees with the contextualist premise that there is no reason or rationality without context but rejects the contextualist conclusion that the standards of rationality cannot transcend a given context. His methodology focuses on the similarities of different contexts and investigates general patterns of communication that apply to all possible languages or linguistic communities. In opposition to empirical pragmatics investigating context-bound speech acts (e.g., sociolinguistics), the analytic units of formal pragmatics are speech acts or communicative actions in general regardless of specific contexts. (see Figure 3.1).

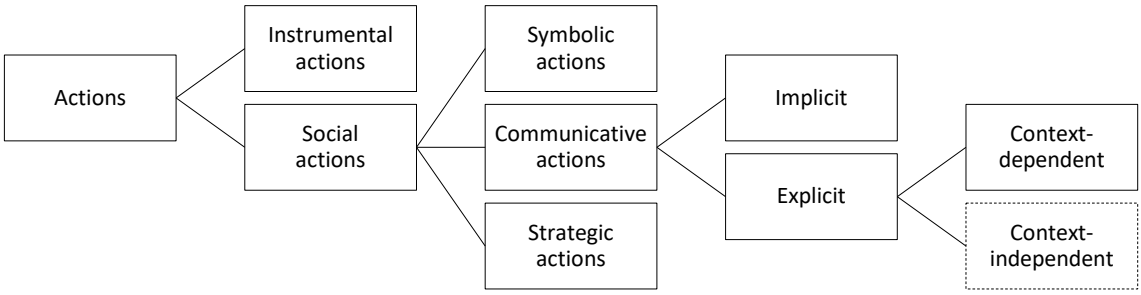

Figure 3.1 Derivation of the analytic units of the theory of speech acts (modified after Habermas 2003a, 62).

Habermas defines communicative actions as social actions that are oriented toward reaching understanding. In contrast to *instrumental actions* (e.g., using a hammer to nail something), *social actions* take place between two or more actors. *Communicative actions* can be distinguished from other social actions, such as *symbolic actions* that present symbolic expressions without propositional content (e.g., performing a concert or dance) and *strategic actions* that follow a rational purpose in a utilitarian way without the intent to reach a mutual understanding (e.g., competitive behavior, combat games). While *explicit* communicative actions have always a propositional component expressing a state of affairs, *implicit* or non-linguistic communicative actions (e.g., signaling to a taxi or joining a demonstration march) usually lack this representational function and are less suitable for analysis. Finally, explicit communicative actions can be *context-dependent* in that particular settings cause shifts of meaning. In such cases, the meaning of a speech act may differ from the meaning of the sentence used in the speech act (e.g., teenage slang). Leaving aside such milieu-specific use of language, formal-pragmatic investigations are interested in *context-independent* patterns of communicative actions or what Habermas (2003a, 61) calls the "general contextual conditions" that need to be fulfilled for any successful speech act. Accordingly, the task of formal pragmatics is to identify and reconstruct universal conditions of possible understanding. In order to define the scope of

his methodology, Habermas relates formal pragmatics and its object domain to some basic semiotic distinctions (see Table 3.1).

Table 3.1 Semiotic distinctions.

Theoretical level	Object domain
Linguistics	Sentences
Grammar	Sentences of an individual language
Grammatical theory	Rules for generating sentences in any language whatever
Aspects of linguistic analysis	
Phonetic theory	Inscriptions (language sounds)
Syntactic theory	Syntactical rules
Semantic theory	Lexical units
Pragmatics	Speech acts
Empirical pragmatics	Context-bound speech acts
Formal pragmatics	Rules for using sentences in utterances
Aspects of formal-pragmatic analysis	
Theory of elementary propositions	Acts of reference and predication
Theory of illocutionary acts	Establishment of interpersonal relations
Theory of first-person sentences	Linguistic expression of intentions

Source: Based on Habermas (2003a, 55).

While *linguistics* is concerned with mere sentences, *pragmatics* investigates the use of sentences in speech acts. Linguistics follows two different strategies for the investigation of rules for generating sentences, namely, an empirical approach to individual languages (grammar) and a formal approach to languages in general (grammatical theory). Only the latter is able to identify context-independent patterns. For example, the insight that every known natural language possesses a functional equivalent for the system of personal pronouns presents a linguistic universal (Habermas 1976). Habermas (2003a) argues that pragmatics, too, should follow these

two different strategies, namely, an empirical approach to communicative actions taking place in particular contexts (empirical pragmatics) and a formal approach to communicative actions in general (formal pragmatics). Again, only the latter is able to identify context-independent patterns. In particular, Habermas identifies three pragmatic universals or general pragmatic functions of utterances that a competent speaker uses synchronously during the course of a speech act. The first function is to represent something by making references or predications in propositions (objective world). The second function is to establish a legitimate interpersonal relation in illocutionary acts (social world). And the third function is to express intentions in first-person sentences (subjective world). These basic functions are related to a rule system that, in analogy to the grammar of sentences in linguistics, constitutes the grammar of speech acts in formal pragmatics. For example, the rule system determines how different modes of communication are related to different types of knowledge, world relations, and validity claims (see Table 3.2).

Table 3.2 Formal-pragmatic features.

	Objective world	Social world	Subjective world
World relation	„The“ world of external nature	„Our“ world of society	„My“ world of internal nature
Type of action	Conversation	Normatively regulated action	Dramaturgical action
Mode of communication	Cognitive	Interactive	Expressive
Characteristic speech act	Constatives	Regulatives	Avowals
Basic attitude	Objectivating	Norm-conformative	Expressive
Function of speech	Representation of facts	Establishment of interpersonal relations	Self-representation
Theme	Propositional content	Interpersonal relations	Speaker’s intention
Validity claim	Truth	Rightness	Truthfulness
Type of knowledge embodied	Empirical-theoretical knowledge	Moral-practical knowledge	Aesthetic-practical knowledge
Form of argumentation	Theoretical discourse	Practical discourse	Therapeutic and aesthetic critique
Model of transmitted knowledge	Theories	Legal and moral representations	Works of art

Source: Based on Habermas (2003a, 81, 92, 165: Table 2.5, 171: Table 2.6).

The ability of communicative actors to employ sentences in speech acts is defined by Habermas (2003a, 47) as “communicative competence.” Following Wittgenstein’s linguistic pragmatics and his notion of language game as a rule-based social practice, Habermas assumes that a player who intuitively understands the rules of a game is not necessarily able to describe them. Following a rule is a generative capacity and the cognitive ability to understand a rule requires first of all the practical skill or know-how of acting according to this rule. Since the only criterion for assessing the adequacy of understanding a language game is successful participation, rules cannot be private but are public and socially constituted. However, Habermas (2001a, 53) criticizes Wittgenstein’s analysis of language games for being an *ad hoc* procedure with a mere

therapeutic intent that aims to exhibit the grammar of language games rather than express it in the form of a systematic theory:

> Had Wittgenstein developed a theory of language games, it would have had to take the form of a universal pragmatics. Wittgenstein, however, did not even consider this theoretical program, which I shall elaborate and endorse as the basis for a communicative theory of society.

Habermas's (2003a, 29) program of universal or formal pragmatics applies formal analyses that can be characterized through the methodological attitude one adopts in the "rational reconstruction of concepts, criteria, rules, and schemata." Such methodologies systematically analyze the implicit know-how of competent speakers and are characteristic of disciplines like logic, epistemology, ethics, aesthetics, action theory, argumentation theory, or reconstructive sciences like linguistics, psychology, and anthropology. Their common goal is to reconstruct the implicit knowledge that underlies the production and evaluation of symbolic expressions, such as accurate descriptions, explanations, and predictions; good arguments and correct inferences; grammatically correct sentences and successful speech acts; and effective instrumental actions, appropriate evaluations, and authentic self-representations (Habermas 2003a). These reconstructions are termed *rational* because they ask for the reasons that a communicative actor could provide for the validity of her or his utterance. Habermas's (1990, 30 [emphases in original]) pragmatic theory of meaning assumes that to understand a speech act means to know under which conditions its implicit or explicit claims of validity are acceptable:

> But only to the extent to which the interpreter also grasps the *reasons* why the author's utterances seemed rational to the author himself does he understand what the author meant. The interpreter, then, understands the meaning of a text only insofar as he understands *why* the author felt justified in putting forth certain propositions as being true, in recognizing certain values and norms as being right, and in expressing certain experiences (or attributing them to others) as being authentic.

Using the prime example of understanding a text document, Habermas (2003a) makes an important distinction between two modes of meaning explication. The first mode is concerned with the *semantic content* of a linguistic expression or the author's explicit know-that. Typically, the meaning of a linguistic expression can be explicated through paraphrasing or translating it into similar expressions. In these cases, the author and the interpreter share an implicit knowledge of the underlying rule system of language use. But sometimes a linguistic expression remains incomprehensible and the interpreter needs to alter her or his attitude by shifting the focus from the surface structure to the deep structure. This shift leads to the second mode of meaning explication that is directed to the author's know-how in terms of the *generative structures* or rule system according to which a linguistic expression is brought forth. In this case, the interpreter no longer shares the position of the author who only applies the intuitive and pre-reflexive capacity to follow a rule system. Instead, the interpreter needs to transform this implicit know-how into an explicit know-that by means of a "rational reconstruction of generative structures" (Habermas 2003a, 33). This mode of meaning explication or reconstructive understanding can be considered to be a kind of "depth hermeneutics" (De Mul 1997b, 240), which Habermas (2001a, 28) calls "hermeneutic reconstructionism" (cp. Kleineberg 2018).

According to the Theory of Communicative Action, such rational reconstructions of communicative competence need to be considered along two analytical dimensions, namely, a synchronic or horizontal dimension that is concerned with the speaker's know-how of generating speech acts according to general formal-pragmatic features, as outlined in Table 3.2, and a diachronic or vertical dimension that deals with how this competence develops over time (McCarthy 1978; Korthals 1997b; Pedersen 2008). Most important for the present study is that the latter dimension regarding the development of communicative competence also reveals a context-independent pattern, namely, an inherent logic of development.

3.1.2 The Logic of Development

As a prototype for rational reconstructions of the development of a specific competence, Habermas (2003a) refers to Jean Piaget's genetic or developmental structuralism. This school of thought is not only influential in developmental psychology explaining the acquisition of cognitive, linguistic, interactive, or moral capacities in ontogenesis or individual development but, as stressed by Habermas (1990, 23), seems to be also promising for the analysis of the collective dimension in terms of "social evolution and the development of worldviews, moral belief systems, and legal systems."

As initial orientation, Habermas (1979) observes a convergence of three theoretical traditions concerned with individual development, namely, the analytic ego psychology (e.g., Erik H. Erikson, Jane Loevinger), cognitive-developmental psychology (e.g., Jean Piaget, Lawrence Kohlberg), and symbolic interactionist theory of action (e.g., George H. Mead) (cp. Appendix D: Tables D.10, D.11). According to him, all of them share to a large extent the following basic assumptions. First, the ability of subjects to speak and act is not only the result of passive maturation but also of an active learning process. Second, this learning process runs through a series of qualitatively distinct and increasingly complex stages of development, a process in which each new stage is built on the preceding stage while no stage can be skipped over. Third, this learning process is not only discontinuous but often crisis-ridden in that a stage transition can be preceded by a phase of destructuration or even regression. Fourth, this learning process has a developmental direction towards increasing autonomy that can be characterized by acquired independence through growing capabilities for problem-solving in dealing with the objective, social, and subjective domains of reality. Fifth, this learning process is formed in social interaction in which ego identity is produced through both *socialization* into a specific social system and *individuation* as growing independence in relation to social systems. Finally, this learning process can be characterized by a transposition of external structures into internal

structures, for example, schemata of action transposed into schemata of thought, as well as interaction patterns transposed into intrapsychic patterns.

For Habermas (1990, 128 [emphasis in original]), the key component of models using the concept of developmental stages is best described in the cognitive-developmental tradition:

> [T]he notion of a path of development which can be described in terms of a *hierarchically ordered sequence of structures* is absolutely crucial to Kohlberg's model of developmental stages. For Kohlberg as for Piaget, synonymous with this concept of a hierarchical order is the concept of a logic of development.

The path of development is logical in that developmental stages are related to each other in an invariant and transitive order, regardless of the context in which development takes place. But it is of utmost importance to note that the *logic of development* says nothing about the learning mechanisms over time or the *dynamics of development* (Habermas 1979; 1984). Wouter van Haaften (1997b, 24) illustrates this distinction between the "order of progress" denoting the developmental sequence of stages (logic) and the "forms of progression" denoting the psychological processes (dynamics) in Figure 3.2:

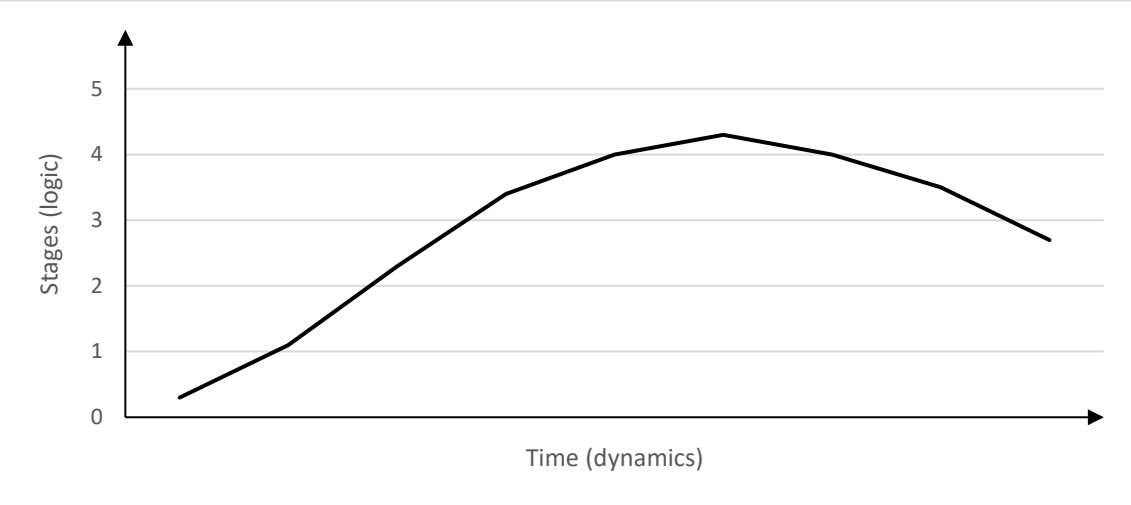

Figure 3.2 Progression and regression through time, seen in terms of the logic and dynamics of a developmental theory (based on Van Haaften 1997a, 24: Figure 2).

The dynamics of development depends on the interaction of an individual with the natural and social environment and, as a matter of fact, not all contextual conditions are equally supportive, which is why the occurrence, rate, and reach of learning processes may differ significantly across individuals (Habermas 1979; Van Haaften, Korthals, and Wren 1997). This even includes the possibility for regressive tendencies, such as decreasing cognitive capabilities in mature adulthood or in extreme stress-situations (Mascolo and Fischer 2010; Overton 2010). According to Habermas (1976; 1979), the development of communicative competence, meaning an actor's growing into the symbolic universe, is closely related to ego development and can be characterized by three general stages that follow a logic of development (see Table 3.3; Appendix B: Tables B.18–B.21).

Table 3.3 General structures of communicative action.

	Cognitive presuppositions	Level of interaction	Action levels	Action motivations	Actors
I	Preoperational thought	Incomplete interaction	Concrete actions and consequences of action	Generalized pleasure/pain	Natural identity
II	Concrete-operational thought	Complete interaction	Roles, systems of norms	Culturally interpreted needs	Role identity
III	Formal-operational thought	Communicative action and discourse	Principles	Competing interpretations of need	Ego identity

Source: Based on Habermas (1979, 83: Schema 3).

At the first stage, the child learns to master symbolically mediated interactions but speech and action are not clearly differentiated. This means that the semantic content of a symbolic expression is bound up with behavioral disposition since the three general pragmatic functions of representing facts (objective world), establishing interpersonal relations (social world) and self-representation (subjective world) are not yet sufficiently separated. The differentiation of the environment into physical and social domains, as well as the demarcation of the self in

relation to the environment are not fully developed. The child is not yet able to perceive, comprehend and judge situations independently of its own point of view because it acts and thinks from a body-bound perspective. This stage is characterized by egocentrism and corresponds to Piaget's preoperational or early concrete-operational cognition and Kohlberg's preconventional moral judgment.

At the second stage, the child becomes aware of the perspectival character of its own point of view and learns to separate sufficiently between subjective, social, and objective world relations. Clear distinctions are made between perceptions and fantasies, between impulses and obligation, and between linguistic signs and the reference or meaning of symbols. The child is able to employ sentences in utterances according to the formal-pragmatic rule system for generating speech acts. The differentiation of speech and action also implies the differentiation between understanding an utterance and accepting the validity claim raised by an utterance. Such claims of validity are evaluated according to cultural norms and values of the child's social system. This stage is characterized by sociocentrism and corresponds to Piaget's late concrete-operational cognition and Kohlberg's conventional moral judgment.

At the third stage, the system of ego-demarcations becomes reflective and the adolescent no longer naively accepts the standards of the social group. Capable to think hypothetically, the youth is able to explain the given from contingent boundary conditions and to criticize existing norms and values as mere conventions. For example, theories or moral representations can be traced back to the cognitive framework of individuals or the will-formation of social groups. The adolescent is able to engage in theoretical discourse as a form of communication that is uncoupled from the processes of action and experience in order to exchange arguments on hypothetical validity claims. The ego can assert its identity independently of concrete roles and particular systems of norms based on the ability to differentiate between norms and principles according to which norms can be generated. This stage is characterized by universalism and

corresponds to Piaget's formal-operational cognition and Kohlberg's postconventional moral judgment.

These three stages of communicative competence present a developmental-logical learning process running through increasing degrees of reflection that leads to a decentering of a person's understanding of the world. This process is described by Habermas (1976) as partly corresponding with, partly based on, and partly complementary to cognitive development. In particular, Habermas (1990) considers the development of symbolically mediated interaction as a precondition for the formative processes of social perspective-taking and moral judgment in ego development. In his formal-pragmatic approach, Habermas (1979, 160) takes recourse to a broad range of rational reconstructions of domain-specific competences in individual development or the "ontogenesis of knowing and acting abilities," which will be discussed in more detail in Chapter Four. In this section, Habermas (1979) methodological decision should be considered to use such developmental-logical models as a heuristic guide for the analysis of the collective development or historiogenesis. Terminologically, it should be noted that the technical term *ontogenesis* meaning individual development originates from biology where it is opposed to the term *phylogenesis* referring to the collective development as the evolution of the species. But since human social evolution or cultural development cannot be explained biologically, this study prefers the terms *historiogenesis* for historical development or *sociogenesis*, as counterpart to *psychogenesis*, for social development (cp. Damerow 1993; Dux 2011). Regarding the relation between individual and collective learning processes, Habermas (1979, 99) writes:

> The ontogenetic models are certainly better analyzed and better corroborated than their social-evolutionary counterparts. But it should not surprise us that there are homologous structures of consciousness in the history of the species, if we consider that linguistically established intersubjectivity of understanding marks that innovation in the history of the species which first made possible the level of sociocultural learning.

To avoid misunderstanding, Habermas does not evoke a kind of recapitulation theory in which ontogenesis echoes, to whatever extent, phylogenesis. As noted by Stephen J. Gould (1977, 147), even Piaget rejects the so-called biogenetic law as irrelevant for psychology because in this field "phylogeny does not cause ontogeny." Nevertheless, some parallel developments can be observed (Strauss 1988; Oesterdiekhoff 2012). In fact, these supposed parallels are the main motivation for both Piaget (1975) and Habermas (1979) to study the development of individuals at all. First and foremost they are interested in processes of cultural development like the history of science or the transformation of collectively shared worldviews. But based on the assumption that the logic of development is the same in all sociohistorical contexts, both of them expect to gain insights from rational reconstructions of learning processes of individuals.

According to Habermas (1979, 99), the homologous structures of consciousness in individual and collective development can be explained by the fact that the socialization of individuals and the reproduction of society are "two aspects of the same process." There is a dialectic between the individual and the society. Individuals are socialized according to the standards of a given society but individuals may also develop a level of reflection in which these standards can be questioned and, if necessary, replaced or improved by more convincing ones. This makes it possible for a given society not only to reproduce itself from one generation to the next but also to develop innovative structures of consciousness that are incorporated, for example, in worldviews, moral belief systems, and legal systems (Habermas 1979; 1984).

Nevertheless, Habermas (1979) cautions against drawing too hasty parallels in the comparison of individual and collective development. First, content and structure should not be confused because individual consciousness and cultural tradition may agree in their semantic content without expressing the same generative structure. Second, not all members of a given society are equally representative of the collectively shared standards. For example, legal systems in modern societies have a universalistic, postconventional structure, even though many

members of modern societies are not able to judge according to principles. Reversely, there are members of archaic societies who are able to master formal operations, although mythological worldviews, which are characteristic of archaic societies, correspond to a less complex developmental stage of cognition. Third, ontogenetically early stages (e.g., incomplete interaction in communicative competence) seem to have no correspondents in the oldest human societies since collective structures hold only for adults, which in any family organization already have developed later stages (e.g., complete interaction in communicative competence). Fourth, the maintenance of a personality system and the maintenance of a social system are not the same. The unifying power of collectively shared worldviews functions not only as protection against cognitive dissonance, as in individual development, but also against social disintegration. With respect to the latter, legal and moral representations need to be distinguished from interpretive systems that serve to stabilize ego and group identities (e.g., conceptions of gods, originary powers, souls, and fate) because both of them can represent different developmental stages within a given society.

For these reasons, a global comparison between individual and collective development is not possible and should be replaced by an identification of particular reference points for comparison. Habermas (1979) suggests, for example, that the process of decentration of worldviews corresponds to ego development (see Appendix C: Table C.10). Likewise, the social evolution of legal and moral representations is supposed to show the same patterns as the individual development of moral judgment (see Appendix C: Table C.12). Furthermore, some isomorphisms seem to exist between the ontogenesis of cognition and the development of basic concepts and logical structures in collective interpretive systems. Examples of such developments of basic concepts are notions of *time*, from biographically experienced to physically measured time, *causality*, from globally grasped to specified causality that differentiates between laws of nature and norms of action, and *substance*, from undifferentiated

to qualified substance distinguishing between animate and inanimate objects. Examples of collectively shared logical structures are presented by the development from *narrative explanations* (preoperational cognition) offered by mythologies in the form of exemplary stories to *deductive explanations* (concrete-operational cognition) provided by cosmologies, philosophies, and higher religions with reliance on first principles to *nomological explanations* (formal-operational cognition) presented by modern science in the form of revisable theories (see Appendix C: Table C.10). Moreover, Habermas (1979) points to some homologous structures between the historical development of social worldviews and the ontogenetic development of the system of ego-demarcations in which formal-pragmatic distinctions are established (see Appendix C: Tables C.10, C.13):

Corresponding to the first stage of natural identity in ego development, the *early mythological worldview* presents a complex of analogies in which natural and social phenomena are not clearly differentiated but interwoven and transformable into one another. In analogy to the egocentrism of the child in which phenomena are made relative to the center of the child's ego, such a sociomorphic worldview makes phenomena relative to the center of the tribe or social group. Nevertheless, members of the group have not yet formed a distinct consciousness of the normative reality of society (social world) apart from the natural environment (objective world) since these domains of reality are not clearly separated.

Corresponding to the second stage of role identity in ego development, the *late mythological worldview* changes the naive attitude to myths towards an understanding in which myths are distantiated to a tradition and function as the legitimation of domination in state-like societies. These developed myths seek to unify the manifold of appearances and distinguish more clearly between society and nature, even though some sociomorphic traits persist. Formally, this unity resembles the sociocentrism of concrete-operational cognition and conventional moral judgment.

Corresponding to the third stage of ego identity in ego development, the *rationalized worldview* breaks with mythological thought. Narrative explanations are replaced by argumentative foundations in the form of cosmological worldviews, philosophies, and higher religions. The traditions inspired by the great founders (e.g., Confucius, Buddha, Socrates, the prophets of Israel, Jesus) present an explicitly teachable knowledge that is open for professional rationalization. These rationalized worldviews that are characterized by a cosmological or monotheistical totality present homologous structures to the universalism of formal-operational cognition and postconventional moral judgment. However, in the course of history this kind of universalistic worldview, which first appeared in developed civilizations, needs to be made compatible with the predominant traditionalistic attitude and political order of a given society. This explains why for a long time the highest principles (e.g., God, Being, Nature, the Absolute), to which all argumentation refers, are themselves immunized against objections and excluded from argumentation. In modern societies, however, the universalistic potential can be set free because the highest principles are no longer unquestionable since religious faith and the theoretical attitude become reflective. This means that modern reflective worldviews have lost their character *as* worldviews, that is, as closed totalities based on collectively shared and socially prescribed frames of reference.

According to Habermas (1979), the logic of both individual and collective development is directed towards a growing decentration and rationalization of interpretive systems and to an increasingly clearer categorical demarcation of the objective, social, and subjective domains of reality. Again, this developmental logic says nothing about the dynamics of development, in particular, it does not presume a continuous, linear, irreversible, or even necessary development. This means that internal factors (e.g., rational learning processes) and external factors (e.g., institutional power relations) need to be carefully distinguished and analyzed separately.

Furthermore, Habermas (1979, 163 [emphasis in original]) underlines that there is a "*dialectic* of progress," meaning that a new developmental stage of learning abilities does not only expand ranges of options but also involves new problem situations and possible pathologies. In particular, learning processes can take the form of a one-sided development exhibiting a "selective pattern of rationalization" (Habermas 1984, 240). For example, the development of modern societies, characterized by a differentiation of autonomous value spheres (i.e., science, moral, and art) or rationality complexes (i.e., cognitive-instrumental, moral-practical, aesthetic-expressive), may tend to privilege a single rationality complex, such as the cognitive-instrumental mode of science with an objectivating attitude, at the expense of others (see Table 3.2). This can lead to dominating or reductionist effects, for example, in the form of *reification* in which the social world of values and norms is approached by an objectivating attitude that is only appropriate for the objective world. A further example of misguided development is presented by *cultural impoverishment* meaning the uncoupling of professionally rationalized expert cultures from communication in everyday life, while at the same time cultural traditions lose more and more their legitimation potential. In other words, development towards higher stages does not automatically mean progression towards something better or higher valued.

From a developmental-logical perspective, however, the rationalization of worldviews implies what Habermas (1979, 184) calls "levels of justification" referring to the acceptability of grounds or reasons and the formal conditions for legitimations. Habermas (1979, 184–85 [emphasis in original]) continuous:

> These levels can be ordered hierarchically. The legitimations of a superseded stage, no matter what their content, are depreciated with the transition to the next higher stage; it is not this or that reason which is no longer convincing but the *kind* of reason.

Such devaluative shifts of the legitimation potential of cultural traditions occur historically, for example, as a break with mythological thought, or more recently as a break with the foundationalism of cosmological, religious, and ontological modes of thought that are grounded in highest principles (see Appendix C: Table C.10). The decisive point is that this developmental logic enables Habermas's methodology of hermeneutic reconstructionism to offer a non-relativistic framework (Kleineberg 2018). In opposition to Gadamer's (2013) philosophical hermeneutics stating that every understanding of a text represents an actualizing appropriation of its meaning by the interpreter, Habermas (1984) emphasizes that the author has not necessarily a superior knowledge compared to the interpreter and that it is not predetermined who will learn from whom. An interpreter who is able to rationally reconstruct the generative structures according to which an author has brought forth symbolic expressions could be able to receive a better understanding of the rule system that underlies the author's language use compared to the author's self-understanding. In this sense, one might say that an interpreter can gain a deeper and more comprehensive understanding compared to that of the author, which enables the interpreter to call into question the raised claims of validity. As Habermas (1984, 135–36) concludes:

> Philosophical hermeneutics rightly asserts an internal connection between questions of meaning and questions of validity. To understand a symbolic expression means to know under what conditions its validity claim would have to be accepted; but it does not mean assenting to its validity claim without regard to context.

Unlike purely descriptive approaches that exclude validity claims from consideration, Habermas's pragmatic theory of meaning enables the interpreter to compare and evaluate different ways of thinking according to normative standards of rationality in terms of levels of justification. This allows hermeneutic reconstructionism to acquire a critical function by providing criteria, for example, for the distinction between power-dominated discourses and

rationally convincing discourses based on learning processes. In contrast to cognitive, cultural, or historical versions of epistemic relativism stating that symbolic expressions originating from a particular epistemic context can only be evaluated according to this context-specific frame of reference, hermeneutic-reconstructive approaches are able to relate different frames of reference to a context-independent logic of development and a hierarchy of levels of justification. As noted by Korthals (1997b, 72), this offers a non-relativistic position for comparison and evaluation:

> Everybody who learns and develops raises developmental validity claims, and so does the theoretican. The fact that there are no objective, non-developmental standards to evaluate such claims is not an argument for relativism. The undeniable possibility of structural learning, i.e., of learning new conceptual frameworks, undermines the view that standards or criteria can only be valid with respect to the particular context of one framework. The very fact that such learning takes place shows that comparisons of different frameworks in foundational development are possible.

As a crucial consequence, this non-relativistic approach sheds new light on the incommensurability thesis with regard to different paradigms, as Habermas (2003a) exemplifies in his critique of Rorty's relativistic understanding of paradigm shifts in philosophy. Following a common conception, Rorty (1979) identifies three succeeding paradigms in the history of Western philosophy from ancient and medieval metaphysics or *ontology* concerned with things (objectivity) to early modern *epistemology* concerned with ideas (subjectivity) to the contemporary *philosophy of language* concerned with words (intersubjectivity). As reported by Habermas (2003a, 354), Rorty considers these historical discontinuities as a "contingent succession of incommensurable paradigms" because, for him, philosophical questions are not settled through finding the right answers but they simply fall into disuse. Habermas (2003a, 353) concludes:

> The contextualist understanding of the linguistic turn from which this anti-realism emerges goes back to a conception of the rise and fall of paradigms that excludes continuity of the theme between paradigms as well as learning processes that extend across paradigms.

The advantage of hermeneutic-reconstructive approaches that take recourse to rational reconstructions is to offer an analytical framework in which discontinuities are embedded in an overarching continuity (Apel 1978; Kitchener 1987; Van Haaften 1997b; Tsou 2006). While the shifts between qualitatively distinct paradigms are discontinuous, the underlying logic of development presents a continuous learning process in which a subsequent paradigm can be considered to be an answer to the open questions of the devaluated preceding paradigm. This comes very close to Thomas S. Kuhn's (2000, 227 [emphasis in original]) own conception of paradigm shifts:

> Concerned from the start with the *development* of knowledge, I have seen each stage in the evolution of a given field as built—not quite squarely—upon its predecessor, the earlier stage providing the problems, the data, and most of the concepts prerequisite to the emergence of the stage that followed.

In the history of Western philosophy, as outlined by Habermas (2003a), the *nominalist revolution* resulting from the dispute about universals at the end of the Middle Ages presents a paradigm shift from ontology to epistemology. Since the inner nature or essence of things is questioned, the relation between mind and nature can no longer be conceived ontologically in that the rules of logic reflect the laws of reality or the order of nature. The paradigm of epistemology responds to that challenge by grounding the standards of knowledge in the subjectivity of the knowing subject. Likewise, the *linguistic turn* resulting from a critique of introspection and psychologism at the end of the 19th century presents a paradigm shift from epistemology to the philosophy of language. Since knowledge is symbolically mediated and symbol systems have a social origin, the

consciousness of an individual can no longer be conceived epistemologically as the transcendental source. The paradigm of the philosophy of language responds to that challenge by grounding the standards of knowledge in the intersubjectivity of a linguistic community. Therefore, Habermas (2003a, 354) concludes, against Rorty's contextualist understanding, that "paradigms do not form an arbitrary sequence but a dialectical relationship," in which older paradigms are not simply replaced but to some extent integrated into the newer ones.

Furthermore, Habermas (2003a, 357) points out that relativism presents a false solution to the problem of the context-dependency of knowledge because it contains a "performative self-contradiction." This means a speech act in which a communicative actor says something and, in doing so, makes quite the opposite. On one hand, the relativist *says* that the standards of rationality cannot transcend their own contexts and one cannot rationally choose between incommensurable frames of reference. On the other hand, the relativist *makes* a choice to adopt her or his own frame of reference and *makes* judgments on the validity of differing ones. As noted by Habermas (2001b, 150):

> To interrupt its own self-referentiality, a relativistic position must make an exception of the stated principle of incommensurability, precisely in the performative act of asserting it.

In Rorty's case, the hermeneutic starting point for a comparison and evaluation of paradigms is the philosophy of language from which he offers reasonable arguments for the necessity of a linguistic turn in philosophy. This is possible because subsequent paradigms do not form arbitrary sequences but processes of rationalization, or as Karl-Otto Apel (1978, 10) concludes, "the three paradigms of First Philosophy make up a hierarchical order of levels of critical reflection." This hierarchical order or logic of development represents the well-known organizing principle of integrative levels. In the following sections, it will be shown which role this organizing

principle already plays in classification theory and how it could be applied to an organization of the epistemological dimension.

3.2 Integrative Levels as Organizing Principle

3.2.1 Integrative Levels in Classification Theory

The organizing principle of integrative levels has a substantial tradition in the field of knowledge organization. In the late 1950s, the British Classification Research Group (CRG) introduced the term *integrative levels* to the discourse on classification theory with reference to biochemist and sinologist Joseph Needham (1937), the inventor of this term, and philosopher James Feibleman (1954), who is known for his generalized laws of the levels (Vickery 1958; Foskett 1961; 1962). In order to determine a scientifically justified sequence of main classes for a general classification scheme, Douglas J. Foskett (1978, 204) emphasizes the usefulness of the idea of integrative levels, which he describes in this way:

> To put it rather simply, the theory of integrative levels is that the world of entities evolves from the simple towards the complex by an accumulation of properties or influences from the environment. Each entity preserves its integrity by means of the relationship between its parts, but as the relationships between the entity and the environment become more complex, the entity grows itself and in due course an aggregation of entities or properties become a new whole of a more complex nature.

In other words, integrative levels can be defined as a developmental hierarchy of increasing complexity and integration. The characteristic properties and structures of the older-level entities are integrated by newer-level entities that exhibit some emergent qualities in addition, which makes them more complex compared to their predecessors. What presents a whole at one level becomes a part of a new whole at the more complex level. A prime example of such a

developmental sequence of integrative levels is presented by the hierarchical order: atoms—molecules—cells—organisms (Feibleman 1954, 62).

The strength of integrative levels as an organizing principle can be seen in its “integrative force” (Foskett 1972, 207) that enables a non-reductionist organization of various kinds of entities or phenomena based on logical principles and a universal scope of coverage. Following Needham (1937), such a big-picture view is required as soon as researchers take the broader context of their specialty into account. Feibleman (1954, 59) even proposes of a kind of "super-science" that is particularly concerned with the interdisciplinary relations between research fields like physics, chemistry, biology, psychology, and anthropology (see Table 3.4).

Table 3.4 Examples of level models.

	Comte	Spencer	Needham	Hartmann	Novikoff	Feiblemann
Atom	Physical	Inorganic	Inorganic	Material	Physical	Physical
Molecule	Chemical				Chemical	Chemical
Cell	Physiological	Organic	Biological	Organic	Biological	Biological
Organism				Psychic		Psychological
Human being	Social	Super-organic	Social	Spiritual	Sociological	Cultural

Source: Modified after Kleineberg (2013a, 347: Table 1; see also Kleineberg 2017: Appendix).

As an organizing principle, the idea of integrative levels has an even longer history than the term itself and can be traced back at least to the classifications of sciences by Auguste Comte and Herbert Spencer, which have a great influence on the construction of classifications and thesauri from the 19th to the early 20th century. Among others, this includes Charles A. Cutter's *Expansive Classification*, Ernest C. Richardson's *Order of the Sciences*, James D. Brown's *Subject Classification*, Henry E. Bliss's *Bibliographic Classification*, and Peter M. Roget's *Thesaurus of English Words and Phrases* (Gnoli 2005; 2017a; Dousa 2009; Kleineberg 2017).

Since the foundation of the Classification Research Group, the idea of integrative levels is frequently discussed in connection with a critique of discipline-centered approaches to classification theory (CRG 1969; Huckaby 1972; Spiteri 1995; ISKO Italia 2007; Szostak, Gnoli, and López-Huertas 2016). As noted by Derek Austin (1969a), academic overspecialization challenges discipline-centered knowledge organization systems by the problems of keeping the classification scheme up to date (currency), inserting new subjects (hospitality), and avoiding multiple entries (cross-classification). Therefore, the CRG's new general classification adopts the organizing principle of integrative levels for a non-arbitrary hierarchical order of main classes to meet James E. Farradane's condition of a "place of unique definition" (Austin 1969b, 111).

Even though the CRG's new general classification does not reach the status of practical application, the assumption that "levels of organization offer the possibility of a new taxonomy of the more than 8000 academic disciplines existing today" (Nicolescu 2010, 27) motivates similar approaches to knowledge organization that are primarily oriented on phenomena or objects of being, such as the *Kyle Classification* (Kyle 1969), the *Information Coding Classification* (ICC) (Dahlberg 2008), the *Integrative Levels Classification* (ILC) (Gnoli 2008a), or the *Basic Concepts Classification* (BCC) (Szostak 2012) (see Table 3.5).

Table 3.5 Examples of classification schemes derived from the idea of integrative levels.

CRG	ICC	ILC*
Physical entities Fundamental particles Atoms, isotopes Molecules Molecular assemblages, e.g., solids *Chemical entities* Elements Compounds Complex compounds *Heterogenous non-living entities* Minerals Rocks Physiographic features Astronomical entities *Artefacts* Raw materials Processed raw materials Components Finished articles *Biological entities* Viruses Organelles Cells Tissues Organs Systems, e.g., digestive systems Organisms Communities, e.g., shoals, herds *Man* Individual Group Local community National community International community *Mentefacts* Units, e.g., digit, note Words, numbers, bars, etc. Sentences, formulae, musical phrases, etc. Paragraphs, themes, etc. Complete works, philosophical systems, etc.	*General forms and structures* *Matter and energy* *Aggregated matter* (cosmos and earth) *Biological objects* Micro-organisms Plants Animals *Human beings* *Societal beings* *Material products of mankind* (economy and technology) *Intellectual products* (science, information and communication) *Spiritual products* (language, literature, music, arts, etc.)	*Form* Forms *Matter* Spaces Particles Atoms Molecules Bulk matter Celestial objects Rocks Landforms *Life* Cells Organisms Populations *Mind* Instincts Consciousness Signals *Society* Social welfare Land products Artifacts Wealth Organizations *Culture* Cultures Art works Knowledge Wisdom

Source: Based on Kleineberg (2013a, 342–43: Figures 1–2).

* This version of the ILC scheme is taken from Gnoli (2008), developed before the publication of the first edition (ISKO Italia 2011) and second edition (ISKO Italia 2019).

In order to define the inherent relations of the principle of integrative levels, Feibleman (excerpted from 1954, 59–63) offers some generalizations in which thoughts by Joseph Needham, Ludwig Bertalanffy, and Alex B. Novikoff are summarized into a dozen laws of the levels:

1. Each level organises the level or levels below it plus one emergent quality.
2. Complexity of the levels increases upward.
3. In any organisation the higher level depends upon the lower.
4. In any organisation, the lower level is directed by the higher.
5. For an organisation at any given level, its mechanism lies at the level below and its purpose at the level above.
6. A disturbance introduced into an organisation at any one level reverberates at all the levels it covers.
7. The time required for a change in organisation shortens as we ascend the levels.
8. The higher the level, the smaller its population of instances.
9. It is impossible to reduce the higher level to the lower.
10. An organisation at any level is a distortion of the level below.
11. Events at any given level affect organisations at other levels.
12. Whatever is affected as an organisation has some effect as an organisation.

These explicit laws make it possible to relate the idea of integrative levels to several well-known organizing principles in the field of knowledge organization (Gnoli 2017a; Kleineberg 2017). To begin with, the *principle of increasing complexity* is reflected by Feibleman's first and second laws stating that integrative levels are cumulative upward in terms of both properties and structures, while an emergent quality is added at each more complex or higher level. With regard to cumulative properties, as suggested by Broughton (2008), this principle is compatible with Bliss's *principle of gradation by specialty* describing a sequence from the most general to the most specific, which is also known as genus-species relation. With regard to cumulative structures, one might speak of the *principle of successive parthood* describing an "organisation

as itself a part of some higher and more complex organisation" (Feibleman 1954, 61), which is also known as part-whole relation.

An implication of the principle of increasing complexity is articulated in Feibleman's third law stating that each higher level depends upon the lower level(s) but not vice versa. This relation could be termed the *principle of successive dependence* (cp. Gnoli, Bosch, and Mazzocchi 2007). Furthermore, Feibleman's eighth law stating that at each higher level the population of instances decreases (e.g., there are fewer molecules than atoms and fewer cells than molecules) could be called the *principle of decreasing span* corresponding to the *principle of increasing depth*, following Arthur Koestler's (1967, 342) terminology of "depth" as the number of levels that an entity encompasses and "span" as the number of entities that exist at a given level. Finally, levels of integration constitute a developmental sequence (Needham 1937; Feibleman 1954; Aronson 1987; Salthe 1991). This means that they are also in accordance with Ranganathan's (1967, 183) principles of “later-in-evolution” and “later-in-time,” which both can be subsumed under Austin’s (1969b) *principle of consecutiveness*.

It should be noted that the principle of increasing complexity and the principle of consecutiveness are apparently irreducible to each other. Not every order of complexity presents a developmental or diachronic sequence of entities but sometimes a rather synchronic one (e.g., tissue—organ—organism) that comes into being concurrently. Reversely, not every evolutionary or developmental change means a change toward increasing complexity (e.g., a new species of bacteria).

In short, the organizing principle of integrative levels can be described in terms of evolutionary order based on the combined main principles of gradation by specialty (genus-species relation), successive parthood (part-whole relation), and consecutiveness (developmental relation) indicating "a conceptual progress from the general to the specific, the simple to the complex, and the past to the present" (Dousa 2009, 76). These inherent relations

are often illustrated by diagrammatic models that evoke notions like *lower* and *higher*, or *deeper* and *shallower* based on different metaphors, such as a nest or a spiral, a pyramid or a staircase, a chain or a ladder, each highlighting certain aspects at the expense of some others (see Figure 3.3).

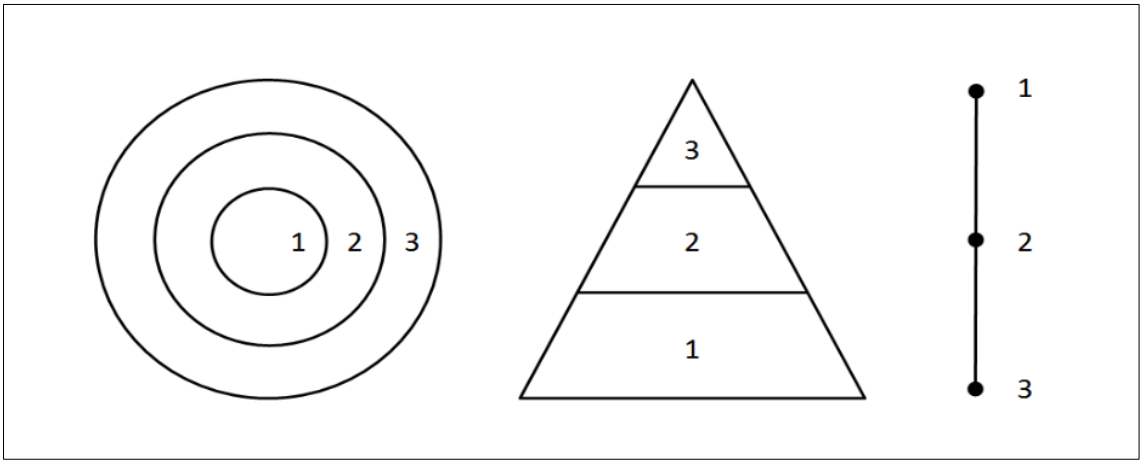

Figure 3.3 Metaphors for integrative levels as nest, pyramid, and chain (Kleineberg 2017, 355).

Like Chinese boxes or Russian dolls, a nest of concentric circles emphasizes the integrative character of the level sequence since a whole level is included as an integral part in the next more complex or higher level. For example, atoms (1) are included in molecules (2) while molecules are included in cells (3). This two-faced aspect of a given level as a simultaneous whole and part is aptly called "holon" (Koestler 1967, 48)—from Greek *holos* "whole" and the suffix -*on* in analogy to proton or neutron suggesting a part or particle—which constitutes the basic unit of a part-whole hierarchy or "holarchy" (Koestler 1967, 103).

Another way to illustrate the same level sequence presents a pyramid where each higher level rests and depends on the more fundamental lower level(s). This underlines the decreasing span or population of instances at each higher level. For example, there are fewer cells (3) than molecules (2) and fewer molecules than atoms (1) (cp. Feibleman 1954; Blitz 1992).

Finally, the same level sequence can be depicted by a simple chain, either horizontally or vertically with increasing or decreasing numbering. Figure 3.3 presents a vertical chain with the inverse sequence of the pyramid placing the most general level at the top. This highlights the role of the least complex but most fundamental level as a root class of a genus-species hierarchy or "specification hierarchy" (Salthe 2009, 87) in which subclasses are derived from a specification of the preceding more general class. For example, the physical level based on atomic matter (1) is specified by the chemical level based on molecular matter (2) which, in turn, is specified by the biological level based on cellular matter (3).

Arguably, the most characteristic attribute of integrative levels is its underlying hierarchical order. In KO theory, hierarchies play a central role in the development of knowledge organization systems and are considered to be the most informationally rich and most effective conceptual relation for KOSs like classifications, thesauri, or formal ontologies (Svenonius 2000; Stock and Stock 2013; Frické 2016; Gnoli 2017a). Unlike equivalence relations or association relations, hierarchical relations can be described in terms of an order in the mathematical sense (Stock and Stock 2013).

In mathematics, order theory is concerned with the intuitive notion of ranking and its formalization by using binary relations for a comparison of pairs of objects. Order relations can be strict or non-strict and rest on the properties of transitivity and antisymmetry (Davey and Priestley 2008). A non-strict order (or non-strict partial order) on a set is a binary relation less-than-or-equal-to on this set such that the following statements hold for all its elements x, y, z:

(a) $x \leq x$ (reflexivity),
(b) $x \leq y$ and $y \leq x$ imply $x = y$ (antisymmetry),
(c) $x \leq y$ and $y \leq z$ imply $x \leq z$ (transitivity).

Every relation less-than-or-equal-to induces a relation less-than of strict inequality in that $x < y$ if and only if $x \leq y$ and $x \neq y$. Therefore, the conditions (a) to (c) can be restated in terms

of a strict order (or strict partial order) on a set meaning a binary relation less-than on this set such that the following statements hold for all its elements x, y, z:

(i) $x < x$ does not hold (irreflexivity),
(ii) if $x < y$ then $y < x$ does not hold (asymmetry),
(iii) $x < y$ and $y < z$ imply $x < z$ (transitivity).

While inside mathematics equality is usually allowed as it is implicit in the non-strict order relation less-than-or-equal-to, outside mathematics the strict order relation less-than appears to be much more common and can be considered to be equally fundamental (Davey and Priestley 2008). Interestingly, there seems to be no consensus in KO discourse since hierarchical relations are described as both non-strict orders (Jolley 1973; Svenonius 2000) and strict orders (Jolley 1973; Stock and Stock 2013; Gnoli 2017a), depending on the understanding of the property of reflexivity or irreflexivity.

This distinction becomes crucial, however, for an application of integrative levels as organizing principle in knowledge organization systems. As the name suggests, levels of integration are based on the following assumptions: First, there are qualitatively distinct *levels* that can be ranked in a linear developmental sequence from the less complex to the more complex. And second, there are hierarchical *integrations* in the form that each more complex level includes the characteristic structures and properties of its predecessors. With regard to conceptual systems like KOSs, the question arises whether or not hierarchical relations present non-strict orders that hold reflexivity. This would mean that a given set (e.g., a class, a concept, a term, a level) includes itself as its own subset (e.g., a subclass, a subordinate concept, a narrower term, a lower level). Given Feibleman's first law of the levels, this seems not to be the case for the idea of integrative levels since a given level includes a lower level while adding something new. This is often characterized as a process of differentiation and integration, or transcendence and inclusion (Spencer 1915; Salthe 1991; Wilber 2000; Lourenço 2016).

Consequently, a given level and its next lower level cannot be identical and the relation of inclusion needs to be defined as an irreflexive one. Hence the hierarchical relation of integrative levels is a strict order that exhibits the properties of irreflexivity, asymmetry, and transitivity.

These explicit definitions of the inherent order relations are crucial for an evaluation of the consistency of proposed level sequences and for a discussion of open problems in the application of integrative levels as an organizing principle (Kleineberg 2017). Of particular importance appears to be the property of transitivity that is supposed to hold for each one of the principles identified above as being constitutive for levels of integration (i.e., increasing complexity, gradation by specialty, successive parthood, successive dependence, decreasing span, increasing depth, and consecutiveness). But transitivity of a hierarchical order requires a homogeneous way of subdivision and this requirement seems to be frequently violated at the price of inconsistent relations of inclusion (Beghtol 2000; Svenonius 2000; Guizzardi 2009; Stock and Stock 2013; Almeida and Baracho 2014).

This can be demonstrated with regard to the proposed basic classification schemes in Table 3.5. For example, the CRG's new general classification suggests some levels of integration that seem to violate the condition of transitivity, particularly, at the physical level (e.g., molecules—molecular assemblages), the biological level (e.g., organisms—communities), and the human level (e.g., individual—group). In all these cases, a kind of "aggregative or societal level" (Austin 1969c, 88) is considered to be a higher and more complex level compared to the level of individual entities. This appears to be problematic in that the principle of consecutiveness does not hold since in evolution collective entities like animal communities or human groups emerge concurrently with the individual entities that form the parts of these collective entities like individual animals or individual human beings. Moreover, different part-whole relations seem to be confused. While the *integrative relation* between atoms, molecules, and cells presents parts as components, the *aggregative relation* between individuals and a

community or group presents parts as members (cp. Zimmerman 2004). This confusion often leads to intransitive hierarchical relations and, therefore, to invalid conclusions, as the following syllogism illustrates (based on Winston, Chaffin, and Herrmann 1987, 431–32):

Premises:	Simpson's arm is part (component) of Simpson.
	Simpson is part (member) of the Philosophy department.
Conclusion:	Simpson's arm is part (?) of the Philosophy department.

One might call the equalization of integration and aggregation resulting in intransitive hierarchies the "individual/collective inconsistency" (Kleineberg 2017, 358). This sheds also new light on the alleged branchings and dead ends observed in modeling integrative levels (Feibleman 1954; Foskett 1961; Austin 1969c; Kyle 1969; Tomlinson 1969). As claimed by Tomlinson (1969), for example, the development from the level of molecules branches into non-living phenomena (e.g., minerals, rocks) and living phenomena (e.g., cells, tissues). But while the development from molecules to cells presents a truly integrative relation, molecules and molecular assemblages like rocks or astronomical entities present a mere aggregative relation. This tendency to consider aggregates like gross material bodies with a quantitative increase in the spatial dimension as increasingly higher levels of integration is called by John L. Jolley (1973, 72) a "dimensional fallacy."

Furthermore, the principle of consecutiveness seems to be violated if non-living human artifacts are placed before living entities, as proposed by the CRG, since artifacts depend on the evolutionary appearance of human beings, as emphasized by Austin (1969b) and Dahlberg (1974) who both refer to Feibleman's (1954, 64) rule that the "reference of any organisation must be to the highest level which its explanation requires."

Another typical violation of the transitivity condition, which can be observed in all three classification schemes presented in Table 3.5., is related to what philosopher Nicolai Hartmann (1953, 79) calls the "psychophysical border line." In the basic scheme of the *Integrative Levels*

Classification, for example, this border line marks the distinction between *life* and *mind* (Gnoli 2008a). Obviously, biological properties and structures at the level of life (e.g., spatial exteriority, cellular structure) are not integrated at the next higher level of mind in which psychological properties and structures appear to be categorically different (e.g., non-spatial interiority, cognitive structure). Therefore, the principles of gradation by specialty and successive parthood do not hold for the relation between life and mind. Consequently, any attempt to consider this relation as integrative levels might be termed the "exterior/interior inconsistency" (Kleineberg 2017, 358).

Of course, such a categorical mistake can be avoided if one adopts a pure materialist approach, as favored by Austin (1969c, 88) who restricts the number of levels to not more than four "truly integrative" ones: fundamental particles—elements—compounds—living compounds. Actually, there exists a well-established tradition of materialism in the discourse on level theories (Novikoff 1945; Rowe 1961; Jolley 1973; Pettersson 1996; Bunge 2003; Vickery 2005). But these approaches appear to be strongly reductionist since they do not take psychical or cultural phenomena into account.

Admittedly, there are significant doubts that the organizing principle of integrative levels, which might be appropriate for a hierarchical order of phenomena studied by the natural sciences, can be equally applied to phenomena investigated by human-related research fields like psychology, social sciences, or humanities (Huckaby 1972; Langridge 1976; Spiteri 1995; Poli 2001; Dousa 2009). Nevertheless, some authors criticize the overemphasis on things or material entities and propose an application of the idea of integrative levels to nonmaterial phenomena, such as ideas, concepts, and other mental products of human beings (Tomlinson 1969; Dahlberg 1974). For example, Barbara Kyle (1969, 14) introduces the term "mentefacts" into classification theory, denoting intellectual concepts and systems including theories and philosophies (see also Gnoli 2018b). Her attempt to identify integrative levels of such mentefacts results in the

following exemplary sequence: words—sentences—paragraphs—complete works (see also Table 3.5). But it remains unclear to what extent this kind of phenomena represent genuine nonmaterial mental phenomena in contrast to material artifacts in which works or theories are manifested. An alternative proposal is made by Phyllis Richmond's levels of mental entities (quoted in Foskett 1978, 207):

1.	An observation	Human being turns red in face
2.	A group of observations	Human being red-faced, eyes flashing, makes noise, gesticulates, etc.
3.	1st level generalization	Human being is angry
4.	2nd level generalization	Human being is frustrated
5.	A law	Anger stems from frustration

Such a level sequence appears to be more promising since it is really concerned with mental phenomena and presents a level sequence that can be considered to be subsequent mental reflections on previous levels. This conception comes close to cognitive-developmental models presenting hierarchical integrations in accordance with the principle of integrative levels (Kleineberg 2014; Lourenço 2016). Nevertheless, the concept of mentefacts and the notion of "levels of ideas" (Huckaby 1972, 100) still remain theoretically underdeveloped in classification theory (Tomlinson 1969; Foskett 1978; Spiteri 1995; Dousa 2009). Not much progress seems to be made since Richmond's statement (quoted in Foskett 1978, 206):

> [I]t is possible to utilize the theory of integrative levels to build a table showing a completely different set of levels, considered solely as mental aggregates, but it does not make it clear what criteria are necessary for the argument or the philosophic approach needed to fit them into one big set of levels.

Regarding the overall architecture of level models, any non-reductionist approach that seeks to incorporate both material and nonmaterial phenomena is challenged by some categorically

orthogonal domains of reality that cannot be arranged as a linear sequence with transitive relations due to a lack of hierarchical integration. This is emphasized, for example, by Roberto Poli's (2001) three domains of the material, the mental, and the social, as well as Ken Wilber's (2000) four domains of the objective, the subjective, the intersubjective, and the interobjective (Kleineberg 2016a). Basically, there are two different strategies to deal with that challenge since either the *linear sequence* of levels will be defended at the price of a hierarchical integration or the *hierarchical integration* of levels will be defended at the price of a linear sequence.

The first strategy is followed, at least to some extent, by Hartmann's (1940) model of levels of reality or strata of being. In this school of thought, the idea of integrative levels is weakened to the more general but less qualified notion of "level of organization" (Gnoli 2017a, 40) stating that each emergent or higher level depends historically and logically on the previous or lower level(s) but without necessarily to integrate lower-level structures and properties. Consequently, even though the principle of consecutiveness still holds, the principles of successive parthood and gradation by specialty are abandoned.

The second strategy is consistently developed by Wilber's (2000) conception of co-evolutionary holons. In this tradition, the idea of integrative levels in the proper sense is maintained while the linearity of the level sequence is given up and replaced by the co-evolution of categorically orthogonal domains of reality that are presented as four interdependent correlates in a quadrant model (Kleineberg 2016a). One advantage of this approach is that the multiple transitive order relations inherent in *levels of integration* offer an informationally richer organizing principle compared to the idea of *levels of organization* that seems to dominate the modeling of levels in KO research today (cp. Gnoli 2017a). Another advantage is that it provides a more elaborate level concept for psychical and cultural phenomena, namely, the concept of Integrative Levels of Knowing. Therefore, the present study adopts this framework of co-

evolutionary holons as a heuristic tool and point of reference for a discussion of various conceptions of Integrative Levels of Knowing.

3.2.2 The AQAL Framework

The analytical framework known as AQAL (All Quadrants, All Levels) is developed by Ken Wilber (2000; 2006) and presents the core elements of his Integral Theory that aims to highlight the complementary character of existing branches of human knowledge, including natural sciences, social sciences, humanities and arts, as well as non-academic approaches like folk science or wisdom traditions. These core elements are explicitly based on formal-pragmatic distinctions in order to provide a "content-free framework that is suitable to virtually any context and can be used at any scale" (Esbjörn-Hargens 2010, 34). The two most important core elements are quadrants and levels, which are supplemented by lines, types, and states.

The first elements of the AQAL framework, the *quadrants*, represent four domains of reality derived from the intersection of two fundamental categorical border lines, namely, the interior/exterior distinction and the individual/collective distinction (Kleineberg 2016a). Similar but independently developed quadrant models can be found in other research fields like sociology (Ritzer 2001), psychology (Juckes and Barresi 1993), anthropology (Ingold 1999), and cybersemiotics (Brier 2008). Each quadrant depicts categorically distinct phenomena (i.e., subjective, objective, intersubjective, interobjective) that cannot be reduced to any other domain of reality (see Figure 3.4).

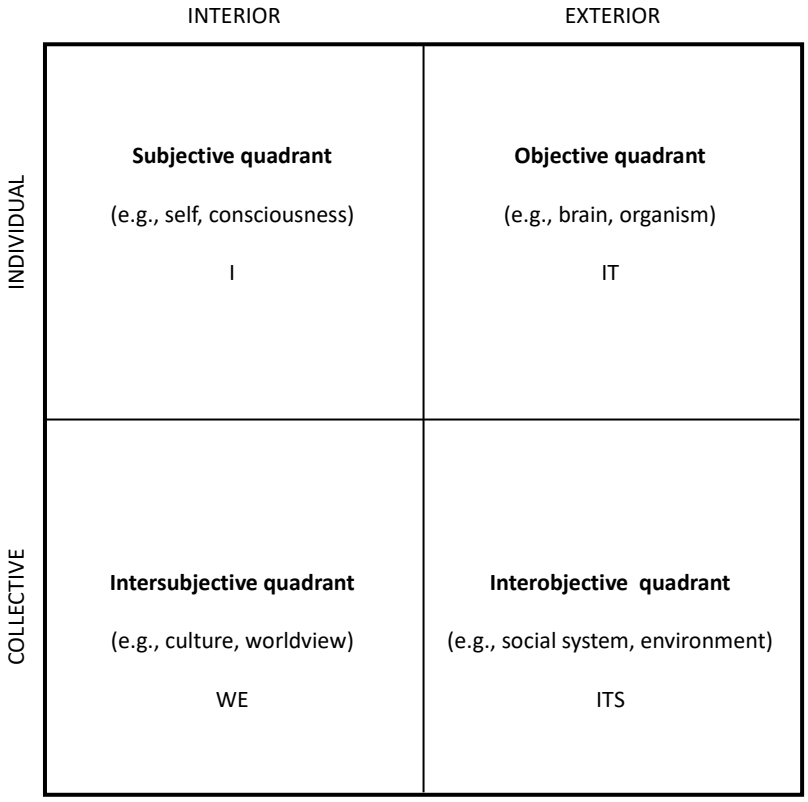

Figure 3.4 Quadrants of the AQAL framework (modified after Esbjörn-Hargens 2010, 36: Figure 1.1, 41: Figure 1.5).

In contrast to pure materialist approaches, this quadrant model also acknowledges the ontological status of psychical or subjective phenomena (interior-individual) and cultural or intersubjective phenomena (interior-collective). This corresponds to Habermas's (1984, 45) formal-pragmatic extension of traditional Greek metaphysics and its restriction to the objective world of existing things (*Welt des Seienden*):

> There is no corresponding concept in philosophy that includes relations to the social and the subjective worlds as well as to the objective world. The theory of communicative action is also meant to remedy this lack.

Note that what Habermas calls the objective world is subdivided here into objective phenomena (exterior-individual) and interobjective phenomena (exterior-collective). This allows a more consistent developmental perspective taking the interrelation between individual and collective

phenomena into account without falling prey to the individual/collective inconsistency. In other words, this distinction avoids to treat collective phenomena (e.g., an animal species) as a higher integrative level compared to the corresponding individual phenomena (e.g., individual animals of that species) because from an evolutionary perspective both of them come into being concurrently and co-evolve together (Kleineberg 2016a). Another advantage is that the differentiation between interobjective phenomena (exterior-collective) and intersubjective phenomena (interior-collective) provides a clear-cut distinction between material and nonmaterial aspects that are often lumped together in notions like *social* or *cultural* (Wilber 2000, 130). This is important because, as emphasized by Brier (2008, 362), "Each of these four worlds demands its own type of narrative," that is, a description language that is adequate for the given kind of phenomena. Brier (2008, 361–62) uses these four different domains of reality also to illustrate how human beings as knowing subjects are situated in categorically distinct contexts:

1. embodied and biologically situated – our body is the principal system for the manifestation of life and cognition [objective, M.K.];
2. conscious and intentionally situated – consciousness is the source of an inner life of cognition, volition, feeling, and perceptual qualities (qualia) [subjective, M.K.];
3. meaning-situated in cultural practice – that is, through language in a social and cultural activity with a network of other living, linguistic, conscious systems [intersubjective, M.K.]; and
4. environmentally situated – in a nature or a universe that is partly independent of our perception and being [interobjective, M.K.].

The four quadrants of the AQAL framework can also be represented by the formal-pragmatic system of personal pronouns that defines the communicative roles of the speaking person (first person), the person being spoken to (second person), and the person who is spoken about (third person). The *subjective quadrant* is represented by the first-person singular (I) and those

phenomena to which the speaker has privileged access, such as feelings and thoughts. The *intersubjective quadrant* is represented by the first-person plural (WE) that is constituted by the reciprocal relationship between a first person speaking to a second person. This domain of intersubjectivity that is concerned with communicative experience and collectively shared nonmaterial phenomena (e.g., languages, worldviews, cultural mentalities, values, norms) is identified by Habermas (1984, 111) as the "'forgotten theme' in the analytic theory of science." Finally, the *objective quadrant* represented by the third-person singular (IT) and the *interobjective quadrant* represented by the third-person plural (ITS) are related to material phenomena that are usually approached by an objectivating attitude characteristic for any third-person perspective. In other words, these four quadrants are also in accordance with the widely agreed-upon distinction of three domains of reality or spheres of values, referred to by Wilber (2000, 149) as the "Big Three" (see Table 3.6).

Table 3.6 The "Big Three."

	First person	Second person	Third person
Buddhism	Buddha	Sangha	Dharma
Plato	The Beautiful	The Good	The Truth
Immanuel Kant	Judgment	Practical reason	Pure reason
Max Weber	Art	Moral	Science
Karl Popper	World II	World III	World I
Jürgen Habermas	Subjective world	Social world	Objective world
Ken Wilber	Subjective	Intersubjective	Objective/Interobjective

Source: Based on Wilber (2000, 149, 426).

The second elements of the AQAL framework, the *levels*, represent developmental stages in each domain of reality according to the chronological and logical order in which phenomena come

into being. These levels are characterized as a hierarchy of holons, a notion that fully applies to the definition of integrative levels (Esbjörn-Hargens 2010, 41 [emphases in original]):

> Levels or *waves* in each quadrant demonstrate *holarchy*, which is a kind of hierarchy wherein each new level transcends the limits of the previous levels but includes the essential aspects of those same levels. Thus, each wave inherits the wave of the past and adds a new level of organization or capacity. As a result, each level of complexity or depth is both a part of a larger structure and a whole structure in and of itself.

The term *waves* is supposed to indicate the rather fluid dynamics of development compared to the reconstruction of the stage-like logic of development. In the AQAL framework, developmental levels are depicted in concentric circles overlaid on the quadrants (see Figure 3.5).

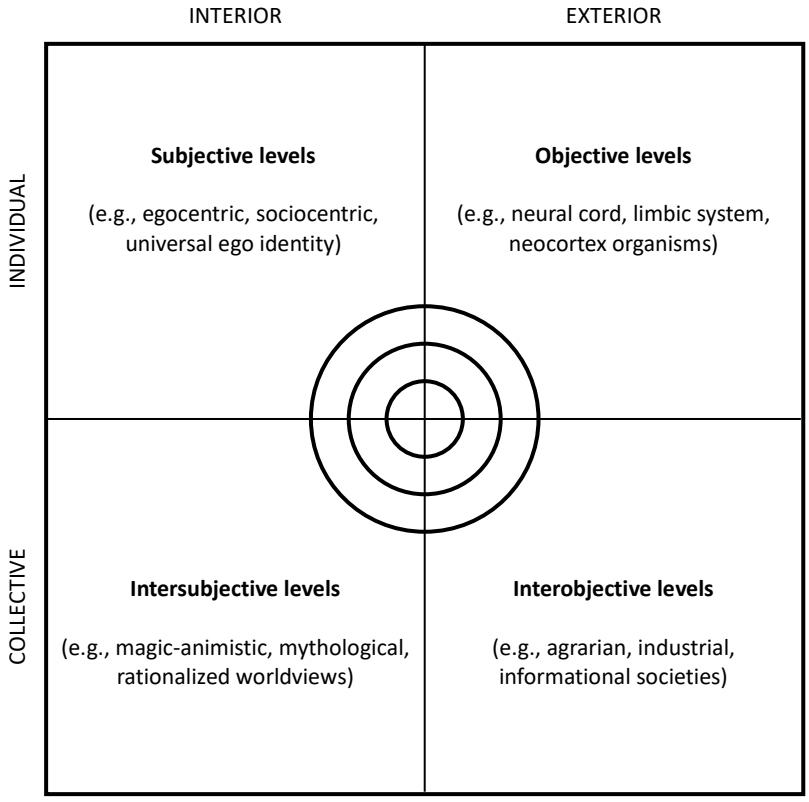

Figure 3.5 Quadrants and levels of the AQAL framework.

The exemplary levels mentioned in Figure 3.5 are supposed to indicate that development takes place in each of the four quadrants. This includes an application of the principle of integrative levels to psychical and cultural development in the left-hand quadrants. As proposed by comparative psychologist Wojciech Pisula (2016, 51), this can be accomplished by "incorporating the levels of consciousness into the framework of integrative levels theory." Accordingly, the AQAL framework introduces the notion of *interior holon* for both subjective and intersubjective level sequences. This conception of interior holons building up an interior holarchy presents what in the present study is termed Integrative Levels of Knowing. This conception seems to be well-established in various cognitive-developmental approaches in psychology and other fields, although often referred to in different terminology (see Appendix A).

Many of these cognitive-developmental approaches agree about the importance to include biological, psychological, and social aspects, often summarized as the "biopsychosocial paradigm" (Robinson 2013, 13). This means that development takes places under the reciprocal influence and constant interaction of these different aspects. Consequently, none of them should maintain methodological primacy over any other since biological, psychological, and social approaches are valid within their own description languages and models of explanation but they need to be integrated into a comprehensive framework in order to avoid reductionism (Overton 2006; Robinson 2013; Newman and Newman 2016).

As developmental psychologist Oliver Robinson (2013, 21) emphasizes, Wilber's AQAL framework provides an effective way of illustrating the interrelation between biological, psychological, social, and ecological aspects of human development:

> This helps us to see how the psychological perspective fits in—it views the human being as a conscious individual with an inner life and intentions, who is simultaneously a biological being and part of social and ecological systems. Psychology should therefore constantly interact with biology, sociology and ecology to glean insights from the

disciplines that specialise in the other three quadrants, while maintaining its distinguishable features.

In other words, the AQAL framework helps to illustrate the multiplicity of aspects that are relevant for cognitive-developmental theories and conceptions of Integrative Levels of Knowing. It helps to better locate the various approaches with their different focuses, as well as to emphasize their divergent but complementary character. For example, models of Integrative Levels of Knowing are applied in such diverse fields as comparative psychology (Pisula 1998; Parker and McKinney 1999; Tomasello 2014), neuroanthropology (Deacon 1997; Donald 2001), cultural and cognitive anthropology (Hallpike 1979; Atran 1990), cognitive archaeology (Mithen 1998; Renfrew and Scarre 1998), medieval history (Radding 1985), history of English literature (LePan 1989), art history (Gablik 1979), among others (see also Appendices B–D).

The AQAL framework also illustrates the interdependent relations between aspects that are often approached from seemingly contradictory positions based on basic dichotomies like subjective-objective or mind-body, biology-culture or nature-nurture, and individual-society, or intrapsychic-interpersonal. As emphasized by developmental psychologist Willis F. Overton (2006), these kind of dichotomies should be overcome by any comprehensive approach to human development. For example, neuroscience investigates cognitive phenomena with a focus on the objective quadrant since there is obviously a kind of correspondence between interior mind and exterior brain with its neuronal activities. But in contrast to pure materialism reducing the human mind to a mere function of the human brain, a more balanced approach should acknowledge that the neuroplasticity of the brain (objective quadrant) is itself influenced by personal experience (subjective quadrant), cultural backgrounds (intersubjective quadrant), and ecological or societal environments (interobjective quadrant) (Thompson 2010; Downey and Lende 2012; Robinson 2013). Likewise, cultural anthropology investigates cognitive phenomena with a focus on the intersubjective quadrant since ways of thinking or forms of knowing in

individuals obviously depend on sociocultural frames of reference. But in contrast to pure sociologism reducing the individual mind to a mere function of the collective culture, a more balanced approach should acknowledge that sociocultural frames of reference (intersubjective quadrant) are themselves influenced by innovative ideas or new levels of reflection achieved by individuals (subjective quadrant), bodily and neuronal activities (objective quadrant), and socioeconomic or technological infrastructures (interobjective quadrant) (Donald 1991; Dux 2011; Oesterdiekhoff 2015).

In short, the four quadrants distinguished by the AQAL framework are inextricably interwoven and development in one of them is both affected by and affecting developments in the others. As a heuristic device, this framework also offers an orientation for the identification of structural parallels or isomorphisms of development across quadrants, for example, between individual and collective development (Dux and Wenzel 1994; Dinzelbacher 2015; Oesterdiekhoff 2014) or between interior and exterior development (Feinberg 2011; Downey and Lende 2012; Oesterdiekhoff 2015). Although there is no one-to-one correspondence between level sequences across quadrants, one might speak of an interdependent co-evolution. This does not mean that the contextual setting illustrated by the AQAL framework completely determines the development in a particular quadrant. But it shows important interrelations that are indispensable for a non-reductionist understanding and should not be neglected in the analysis of the development of human cognition (cp. Brier 2008).

The AQAL framework also allows to trace back levels of development to its pre-human origins in the animal kingdom or in even earlier forms of evolution (see Appendix C: Tables C.5, C.15–C.18). In fact, the center of the quadrant model represents the starting point of evolution in the most general sense, commonly referred to as the Big Bang (see Figure 3.6).

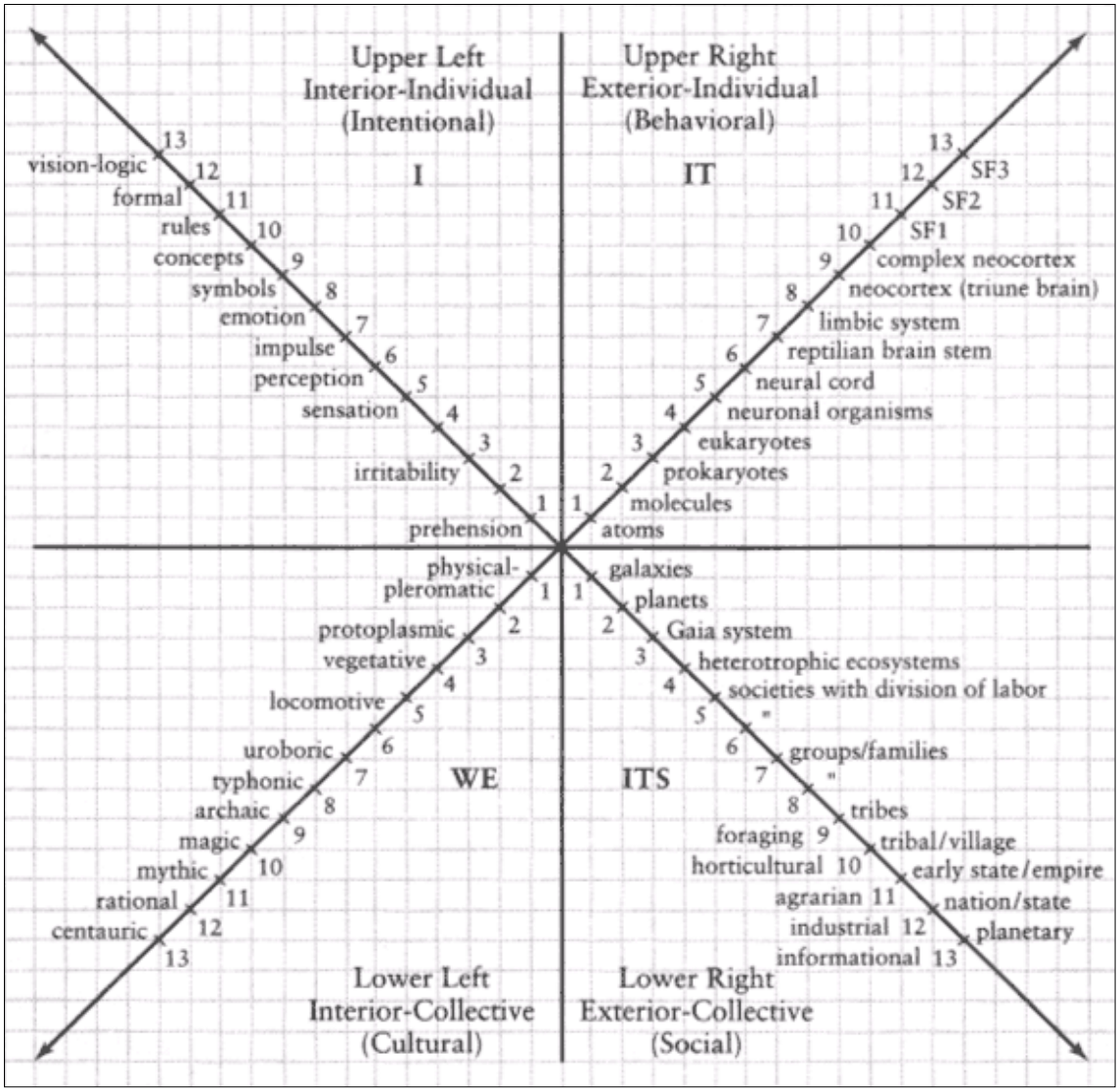

Figure 3.6 AQAL framework with exemplary levels of development (Wilber 2000, 198: Figure 5-1).

In Figure 3.6, Wilber depicts some milestones in the cosmological evolution up to the present with reference to a broad range of already existing developmental models originating from diverse disciplinary backgrounds (SF is an abbreviation for Structure Function as a placeholder for neural-physiological correlates of mental development). Besides *objective levels* (e.g., from atoms to molecules to cells to more and more complex organisms) and *interobjective levels* (e.g., from solar systems to planetary systems to ecosystems to more and more complex social systems), this also includes *subjective levels* and *intersubjective levels* regarding the psychical and cultural development. The terminology is adopted from already existing models of development,

among others, from Jean Piaget, Erik H. Erikson, Jean Gebser, Erich Neumann, Erich Jantsch, and Jürgen Habermas (Wilber 2000; Kleineberg 2016a).

It seems to be still a matter of controversial debates to what extent these subjective and intersubjective levels can be reconstructed to its evolutionary origins. While many comparative psychologists would probably agree with Alexei N. Leontiev's reconstruction of consciousness development beginning with the transition from irritability to sensitivity and leading to perceptivity to animal intellect up to human consciousness (Tolman 1987), much less agreement should be expected for Lynn Margulis's (2001, 55) starting point of "microbial consciousness" at the cell level or even for Alfred N. Whitehead's (1978, 18) notion of "prehension" as a kind of non-sensory awareness at the atomic level. Wilber (1999, 710) himself proposes a kind of panpsychism, which he calls "pan-interiorism", assuming that every exterior holon has also an interior holon as counterpart and that all four quadrants as categorically different domains of reality have come into being concurrently (Kleineberg 2016a). But this assumption remains hypothetical and, as Wilber (2000) admits, appears to be unnecessary for using the AQAL framework as a heuristic device since the starting point of interior developments in the left-hand quadrants can be freely chosen and depicted at any level that one considers to be appropriate.

Moreover, Wilber (2000, 198) emphasizes that the "schematic and simplifying nature" of Figure 3.6 should be kept in mind. In particular, the level sequences depicted in each quadrant are restricted to one or only a few domains of development at the expense of others. For example, the subjective levels (interior-individual) focus on the domain of logico-mathematical development as reconstructed by the Piagetian tradition (e.g., *rule* means concrete-operational, *formal* means formal-operational, and *vision-logic* means postformal cognition) at the expense of others, such as moral, interpersonal, and aesthetic development.

The third elements of the AQAL framework, the *lines*, are thus intended to address the domain-specificity of development. Different lines of development can be qualified within each

of the quadrants. Besides *subjective lines* just mentioned, there are *objective lines* (e.g., organic structures, neural systems, skeletal-muscular growth), *interobjective lines* (e.g., forces of production, geopolitical structures), and *intersubjective lines* (e.g., worldviews, cultural values, philosophical positions) (Esbjörn-Hargens 2010). These qualifications are important because development in different lines usually occurs in an asynchronical way, which means that the same person (or the same group or society) at a particular point in time can be highly developed in one line while averaged or even poorly developed in other lines. It is important to note that for this reason the notion of a logic of development applies only within a particular line of development. Terminologically, subjective or intersubjective *lines* are also often referred to as "domains" (Mascolo 2008, 330), "dimensions" (Korthals 1997a, 93), "streams" (Parsons 1987, XIII), or "specialized capacity spheres" (Demetriou, Mouyi, and Spanoudis 2010, 328).

Nevertheless, for the vast majority of existing level models of cognitive development it seems to be possible to be aligned along a common developmental continuum. As outlined by Zachary Stein (2008a, 5), Integral Theory relies on the notion of "altitude" as an orienting generalization. Different developmental lines in the subjective quadrant can be presented by a so-called psychograph (for the intersubjective quadrant it is called sociograph) that presents a generic developmental continuum using different degrees of altitude as common points of reference (see Figure 3.7).

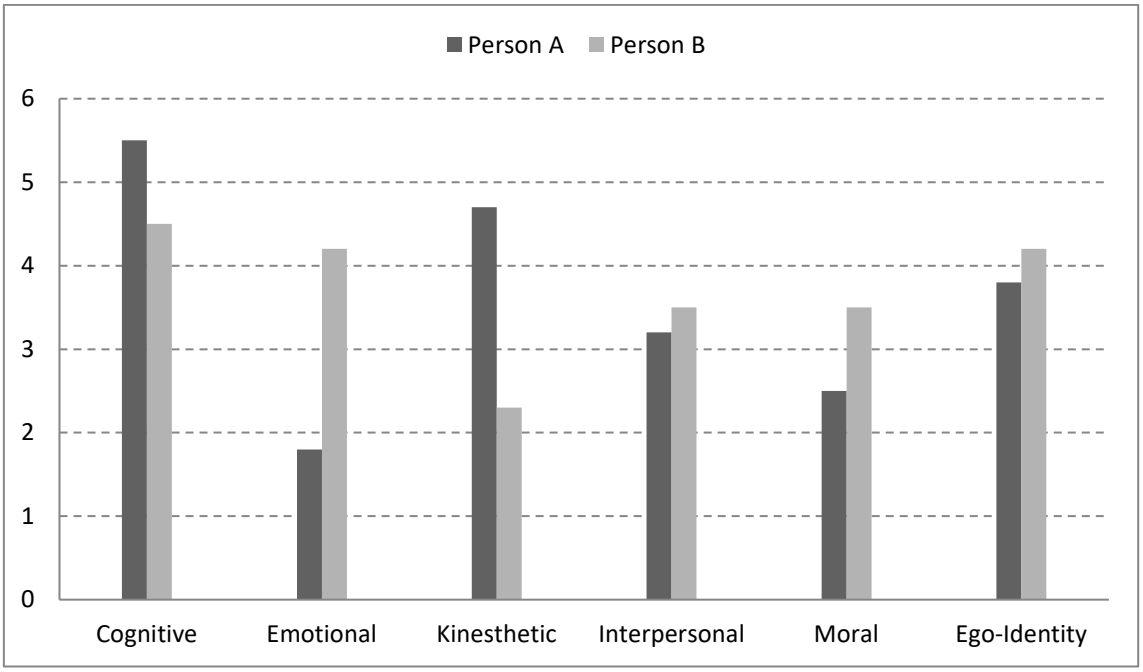

Figure 3.7 Exemplary lines of development (modified after Esbjörn-Hargens 2010, 44: Figure 1.7).

The psychograph in Figure 3.7 shows hypothetical developments in six distinctive lines for two different persons. This helps to illustrate two important points regarding the conception of Integrative Levels of Knowing. The first point is that there does not exist an overall developmental level of an individual person but a complex distribution and an asynchronous growth of skills or competences across domain-specific lines. For example, at the same time person A is highly developed in the cognitive and kinesthetic lines, on average in the interpersonal and moral lines, and poorly developed in the emotional line. By comparison, person B appears to be less developed in some lines but more developed in some others. This means that a global comparison, resulting in the claim that one of these persons is at a higher or lower level of development, would be inappropriate. There is a stage-like logic of development for domain-specific and task-specific skills or competences but not for an individual as a whole.

The second point is that it seems to be possible to compare different developmental lines according to their degree of altitude, that is, the depth or height of developmental levels, as indicated by the vertical axis in Figure 3.7. One way to do this is to use statistical probabilities

based on empirical data that show correlations between developmental lines. For example, empirical findings may show that individuals at a given level in one developmental line (e.g., postconventional level in the line of moral judgment) correlate most often with certain levels in other lines (e.g., formal-operational level in the line of cognition) (Stein and Heikkinen 2008; Lourenço 2014). If such correlations were significant for a large sample of individuals, they could be used for a mapping of different level models. Another way to interrelate different developmental lines is to identify isomorphisms based on structural analysis. For example, Michael J. Parsons (1987, XIII) observes structural similarities or "corresponding streams" in the cognitive, moral, and aesthetic lines of development, explaining them with reliance on Habermas's formal-pragmatics and rational reconstruction. Such a structural analysis allows authors like Robert L. Selman (1980), James W. Fowler (1981), Michael J. Parsons (1987), and Susanne R. Cook-Greuter (2010a) to adopt, for example, Kohlberg's terminology of *preconventional*, *conventional*, and *postconventional* stages or levels for other domain-specific lines of development, such as interpersonal, spiritual, aesthetic, and ego-identity development. Similar approaches that identify isomorphisms across multiple domain-specific lines are presented by Michael L. Common's (Commons and Richards 1984; Commons et al. 1989) General Stage Model or Zachary Stein's and Katie Heikkinen's (2008) Lectcial Assessment System (see also Appendix D). Some authors use a terminologically neutral color code to indicate such general degrees of altitude (Wilber 2006; Esbjörn-Hargens and Zimmerman 2009; Laloux 2014; DiPerna 2018; see also Appendix B: Tables B.14–B.16; Appendix C: Table C.14; Appendix D: Table D.30).

Finally, the AQAL framework comprises two further core elements that help to qualify different kinds of phenomena and to distinguish developmental from non-developmental patterns. The fourth elements of the AQAL framework, the *types*, refer to non-developmental differences of phenomena within each quadrant (Esbjörn-Hargens 2010). There are *objective*

types like blood types (e.g., A, B, AB, 0) or body types (e.g., ectomorph, mesomorph, endomorph). There are *interobjective types* like biome types (e.g., steppe, tundra, islands) or regime types (e.g., monarchy, oligarchy, democracy). There are *subjective types* like personality types (e.g., extroverted, introverted) or gender types (e.g., feminine, masculine). And there are *intersubjective types* like worldview types (e.g., theocentric, cosmocentric) or cultural types (e.g., high or low power distance, high or low uncertainty avoidance) (Esbjörn-Hargens 2010). The fifth elements of the AQAL framework, the *states*, refer also to non-developmental but more temporary differences of phenomena. They include *objective states* like brain states (e.g., alpha, beta, delta, or theta waves activities), *interobjective states* like economic states (e.g., recession, boom), *subjective states* like emotional states (e.g., elevated, depressed), and *intersubjective states* like group states (e.g., mass hysteria, crowd excitement) (Esbjörn-Hargens 2010).

For the present study, it appears to be particular useful that the AQAL framework can be applied in two fundamentally different ways. The first way is that the quadrants, levels, lines, types, and states can be used ontologically by depicting and organizing the plethora of world phenomena. This refers to the ontological dimension someone is *looking at* and is related to the subject matter in document indexing. For example, the subject matter of Kohlberg's (1976) research article *Moral and Moralization – The Cognitive-Developmental Approach* is concerned with the phenomenon of Integrative Levels of Knowing in individual development (subjective quadrant) in terms of preconventional, conventional, and postconventional stages (subjective levels) for the domain of moral judgment (subjective line). The second way is that the elements of the AQAL framework can also be used epistemologically by depicting and organizing the plethora of world perspectives. This refers to the epistemological dimension and the frame of reference or lens someone is *looking through* and is related to the context features in document indexing. For example, Kohlberg's moral stages can also be used to describe the authorial perspectives of documents, such as the *Old Testament* (e.g., Exodus 21:24 "eye for eye, tooth for

tooth") and the *New Testament* (e.g., Matthew 5:39 "If anyone slaps you on the right cheek, turn to them the other cheek also"), which apparently express very different justice concepts or moral views (Bible 1978; see also Appendix E: Table E.1).

From a theoretical perspective, it appears to be also useful that the AQAL framework applies the three main principles of Wilber's Integral Theory that may function as a heuristic guide for a non-relativistic approach to the organization of the epistemological dimension (Wilber 2006; Esbjörn-Hargens 2010). First, the *principle of non-exclusion* seeks to avoid reductionism by taking as much as possible methodological approaches and epistemological perspectives regarding a given object of interest into account. Second, the *principle of enfoldment* seeks to avoid relativism by acknowledging that not all approaches or perspectives are equally valid but some of them tend to be more comprehensive and more convincing than others. And third, the *principle of enactment* seeks to avoid unnecessary metaphysical assumptions by considering phenomena not simply as ontological givens but as partly constructed by individual subjects or epistemic communities in the process of knowing them. This also implies that the AQAL framework does not present a neutral perspective and can be understood from different levels of knowing (Stein 2010; see also Appendix B: Table B.41).

Nevertheless, there are also some weaknesses in Wilber's overall approach, which in the present study are partly viewed as methodological limitations and partly as unnecessary assumptions. Regarding the methodological limitations, Wilber's (2000, 5) attempt to integrate various branches of knowledge refers to the notion of "orienting generalizations" in the sense of "already-agreed-upon knowledge," which appears to be problematic in that it tends to ignore the fact that often some issues are still a matter of debate (Meyerhoff 2010). Regarding the unnecessary assumptions, Wilber presents some speculative conclusions that are insufficiently grounded and contradict the mainstream views. For example, with reference to Alfred N. Whitehead, Pierre Teilhard de Chardin, Erich Jantsch, among others, he argues for a kind of

panpsychism and a spiritual view of evolution that assumes a directionality toward increasing complexity based on a generic drive towards self-organization (Visser 2020). But as argued by Cook-Greuter (2005), there is no need to fully agree with Wilber's philosophy in order to appreciate the heuristic value of the AQAL framework. Thus, this framework will be used only heuristically in the following chapter as a point of reference for a discussion of various conceptions and models of Integrative Levels of Knowing.

3.3 Summary

This chapter is concerned with the theoretical and methodological foundation of a systematic organization of the epistemological dimension of human knowledge. It has been argued that such a systematization requires analytical tools and principles of organization that can be applied to epistemic contexts in general, not restricted to particular contexts. In semiotic terms, the analysis of epistemic contexts refers to the field of pragmatics that investigates the relation between a symbolic expression and its use by communicative actors. In this regard, Jürgen Habermas's (2003a) approach of universal or *formal pragmatics* concerned with the reconstruction of general patterns and conditions of language use has been introduced as a theoretical and methodological foundation. It has been demonstrated that formal-pragmatic analyses are able to rationally reconstruct the underlying rule system and generative structures of communicative actions in a systematic way. This includes a *horizontal reconstruction* of distinct speech acts (e.g., constatives, regulatives, avowals), their world relations (e.g., objective, social, subjective), and their validity claims (e.g., truth, rightness, truthfulness), as well as a *vertical reconstruction* of the underlying logic of development of communicative competence.

This study refers to such a developmental-logical pattern as Integrative Levels of Knowing because it shows the same constitutive properties that are attributed to the traditional organizing principle of integrative levels, as introduced by Joseph Needham (1937) and James

Feibleman (1954). The advantage of this terminological decision is that developmental-logical approaches to human cognition and communication can be related to the existing discourse on integrative levels in the field of knowledge organization in which the consideration of cognitive-developmental aspects appears to be largely neglected or theoretically underdeveloped. As a heuristic device, Ken Wilber's (2000) AQAL framework is introduced to present a consistent architecture of categorically distinct domains of reality in which development takes place. In particular, this framework helps to differentiate more clearly between individual and collective dimensions, as well as between different domain-specific lines of the development of human cognition and thus offers an orienting guide for a cognitive-developmental approach to knowledge organization.

4 THE COGNITIVE-DEVELOPMENTAL APPROACH TO KNOWLEDGE ORGANIZATION

4.1 Conceptions of Integrative Levels of Knowing

4.1.1 Cognition and Development

As outlined in the previous chapter, a systematic organization of the epistemological dimension of human knowledge might benefit from an orientation on basic formal-pragmatic distinctions in relation to communicative actions. This includes a synchronic or *horizontal dimension* distinguishing between different world relations (e.g., objective, social, subjective) and different domain-specific lines of development (e.g., cognitive, interpersonal, moral, ego-identity, aesthetic), as well as a diachronic or *vertical dimension* distinguishing between different stages of development in terms of Integrative Levels of Knowing. From a methodological point of view, this refers to depth-hermeneutic approaches that take recourse to both a "horizontal reconstruction" and a "vertical reconstruction" (Korthals 1997b, 57, 59).

In this chapter, it will be explored to what extent already existing theories and models on cognitive development from a broad multidisciplinary background offer such rational reconstructions on which depth-hermeneutic analyses can be grounded. After a discussion of the basic concepts of *cognition* and *development*, the notion of Integrative Levels of Knowing will be distinguished in strong and weak conceptions as they can be found in different research traditions. Furthermore, a range of exemplary cognitive-developmental models will be presented that provide domain-specific sequences of Integrative Levels of Knowing for both individual and collective development. This chapter closes with an outline of how such models of Integrative Levels of Knowing can be applied to document indexing, taking Kohlberg's reconstruction of developmental stages of moral consciousness as an example.

Admittedly, it might be misleading to speak of *the* cognitive-developmental approach since there is a broad range of different disciplines, theories, and methodologies involved and

some important issues are still a matter of controversial debates. Nevertheless, it will be argued that despite their differences many research traditions present similar conceptions of cognitive development. Therefore, the present study uses the notion of *cognitive-developmental approach* as an umbrella term for those theories and models that present a developmental-logical conception of cognitive growth and thus a version of the organizing principle of Integrative Levels of Knowing (see Appendix A).

The proposed cognitive-developmental approach, however, should not be equated with the cognitive view to knowledge organization, as discussed in Chapter Two. In particular, the cognitive-developmental approach does neither assume that cognition takes place in an isolated individual mind nor that the "human mind is physiologically and psychologically the same since the homo sapiens was born" (Neelameghan et al. quoted in Hjørland 2013c, 15). Instead, it is acknowledged that cognition is embedded in a rich contextual network, as emphasized by Hjørland (2018b, 322) with reference to new perspectives and concepts from the cognitive sciences, such as:

- embodied cognition (cognition as actively constructed from select environmental features)
- enculturated cognition (the co-evolution of cognition and culture)
- distributed cognition (cognition stretching across systems of humans and artifacts)
- situated cognition (cognition located in and arising from interactions within situations)
- the cognitive-historical approach (reconstructing conceptual changes in the history of science).

In fact, these notions are also reflected by the AQAL framework that serves as a point of reference for the cognitive-developmental approach. For example, *embodied cognition* refers to the fact that human cognition (subjective quadrant) is bound to the human body and brain (objective quadrant), *enculturated cognition* stresses the interrelation between human

cognition (subjective quadrant) and human culture (intersubjective quadrant), and *distributed cognition* means that human cognition (subjective quadrant) takes place in complex systems and environments (interobjective quadrant). While *situated cognition* emphasizes particular contextual settings or ways in which the quadrants of the AQAL framework interact with one another, the *cognitive-historical approach* indicates the diachronic dimension of contextual change that can be related to the levels of the AQAL framework.

Furthermore, the cognitive-developmental approach rejects the common limitation of the cognitive view to user studies or user-based approaches to knowledge organization (cp. Hjørland 2013c). Instead, all actors of information systems are taken into account including the producers, mediators, and consumers of documents. In this regard, Hjørland (2013c, 23) underlines the important distinction between individual and social aspects or between psychological and epistemological approaches:

> Psychology is about general models of minds or about individual minds. Epistemology, on the other hand, is about ways of thinking ("paradigms") as reflected by scientific disciplines and by groups of people.

He argues for a turn from psychology-oriented user studies concerned with abstract minds like the cognitive view to epistemology-oriented approaches like the domain-analytic approach to knowledge organization. But Hjørland's distinction between psychology and epistemology appears to be somewhat misleading when psychology is exclusively related to the individual dimension and epistemology is exclusively related to the social or collective dimension. Indeed, *psychology* is concerned with models of how people think and know but this also includes the collective dimension. For example, social psychology and cultural psychology investigate how groups and cultures shape the psychological processes of their members (Christopher and Bickhard 2007). The other way around, *epistemology* is not at all restricted to the collective dimension of knowing as investigated, for example, by social epistemology or historical

epistemology but also includes the individual dimension. The decisive feature of epistemology, not explicitly mentioned in Hjørland's quoted distinction, is its consideration of validity claims. While psychology is largely descriptive, epistemology is normative in its core since it does not only ask how people think and know but also to what extent different ways of thinking or forms of knowing are valid in terms of truth, rightness, and truthfulness. One of the most prominent traditions of epistemology is rooted in Jean Piaget's genetic epistemology that is concerned with both individual and collective development of new forms of knowing. Although his "historisch-kritische Methode" (historical-critical method) (Piaget 1975, 21) is interested in significant changes of ways of thinking in the history of science or human history in general, he considers the investigation of individual development methodologically more fruitful for an understanding of structural transformations of thinking. Interestingly, even Thomas S. Kuhn (2000) refers to Piaget's work on cognitive development of children as a major inspiration for his own conception of *paradigm shifts* in the history of science (cp. Tsou 2006). The decisive point is that epistemology, like psychology, is concerned with both the individual and collective dimensions of cognition and none of them should be neglected. The dialectics between the individual dimension and the collective dimension suggests that Hjørland's turn from an individual-oriented cognitive view to an collective-oriented domain-analytical approach is in danger to replace one reductionism (psychologism) with another (sociologism). Instead, the proposed cognitive-developmental approach is intended to integrate both dimensions, which is why models of both individual and collective development of knowing are considered to be important.

In order to distinguish developmental-logical from other conceptions of cognitive growth, the basic terms *cognition* and *development* need to be more qualified. According to the traditional division of psychology into the studies of thinking (cognition), feeling (emotion), and acting (motivation), the subfield of cognitive psychology is concerned with genuine

cognitive processes, such as attention, perception, reasoning, calculating, classifying, problem-solving, or remembering. But these cognitive processes are so fundamental that they affect virtually any branch of psychology (Harré 2002; Overton 2006; Mascolo and Fischer 2010). Therefore, a narrower and a broader understanding of the concept of *cognition* should be distinguished. In the narrower understanding, cognition refers to the mental processes just mentioned. According to the AQAL framework, the adjective *cognitive*, then, refers to a domain-specific developmental line besides others (e.g., interpersonal, moral, ego-identity; cp. Figure 3.7). For example, Piaget's model of logico-mathematical development refers to this narrower understanding. In the broader understanding, however, cognition means the process of thinking in general, covering all other developmental lines of knowing. In this sense, authors like Robert L. Selman (1975), Lawrence Kohlberg (1976), and Michael J. Parsons (1987) use the term *cognitive-developmental approach* also with regard to interpersonal, moral, and aesthetic lines of development. For the present study, both meanings are important. On one hand, the proposed cognitive-developmental approach is intended to be wide enough to include any domain of human knowledge that can be developed in terms of integrative levels. On the other hand, it should be noted that human thinking does not develop evenly across domains, which means that one should avoid speaking of *levels of cognition* or *levels of knowing* without qualifying the domain-specific line of development.

In a similar way, the term *development* can have different meanings in different developmental theories. Not all of them are in line with the organizing principle of integrative levels and even cognitive-developmental theories that subscribe to the notion of Integrative Levels of Knowing can be differentiated into strong and weak versions. As initial orientation, Willis F. Overton (2006, 29) proposes an "inclusive definition of development" emphasizing the interdisciplinary and comparative character of developmental inquiry. This broad understanding includes developmental change in phylogenesis (development of the species),

historiogenesis (development of culture), embryogenesis (development of the embryo), ontogenesis (development of the individual across the life span), microgenesis (development across a short time span), orthogenesis (normal development), and pathogenesis (development of psychopathology). According to Overton, virtually all developmental theories agree that development is about change over time. Lesser agreement exists, however, about the question whether or not enduring change is sufficient to be characterized as development (Van Haaften, Korthals, and Wren 1997; Overton 2006; Robinson 2013). For example, development is often contrasted with aging to distinguish between mere change of a person over time and a directed scale of optimal development that allows to identify, for instance, age-related declines occurring in mature adulthood. As Overton (2006) notes, age is only an index of time and time as such cannot be an independent variable since it simply presents a dimension along which processes operate. Therefore, developmental psychologists Barbara Newman and Philip Newman (2016, 3 [emphasis in original]) offer the following more qualified definition:

> The term *development* implies change that occurs over time and has a direction. The direction is usually from simple to more complex, from less organized and coordinated to more organized and coordinated, or from less integrated to more integrated.

According to Robinson (2013, 8), there are at least five different understandings of "direction" for optimal development, namely, the orthogenetic, evolutionary, veridical, eudaimonic, and virtuous directions. *Orthogenetic direction* means change towards higher levels of integrated complexity. The orthogenetic view, coined by developmental psychologist Heinz Werner (1948), describes development in terms of differentiation and integration. Since this view is in accordance with the principle of Integrative Levels of Knowing, it is the most important one in this study and should be distinguished from other understandings of directed development. *Evolutionary direction* refers to an improved capacity to survive for reproduction. This view

considers development as reproductive success regardless of levels of complexity and integration. *Veridical direction* aims to more authenticity and truthfulness by replacing false or biased beliefs with more accurate ones. This view is related to normative-philosophical questions that need to be analytically distinguished from empirical questions regarding levels of integrated complexity. But it is important for rational reconstructions of cognitive development and their argument that, at least in some respect, higher levels can be considered to be more adequate or more accurate than lower levels. *Eudaimonic direction* describes a tendency towards happiness, fulfilment, and well-being. This view has a focus on themes like purpose in life, self-acceptance, environmental mastery, positive relationships, autonomy, and personal growth. Since happiness or well-being appear to be highly subjective, they do not simply correspond to levels of complexity and integration. *Virtuous direction* is oriented on the goal to be a good or righteous person. The ideal of a mature person is often considered as being less self-centered and more oriented towards others. But there can be very different indicators of maturity across cultures and these are not necessarily related to levels of integrated complexity. The crucial point is that all these five directions for optimal development should be analyzed separately because orthogenetic complexity may or may not be related to evolutionary reproduction, veridical authenticity, eudaimonic fulfilment, or virtuous maturity.

A further important distinction is emphasized by Overton (2006, 25) between "variational" and "transformational" developmental changes. *Variational development* means the extent or degree that change varies from a norm or standard. This can be a skill or ability becoming more precise and more accurate like the toddler's improvement of walking or the child's growth of vocabulary. This kind of development is additive in nature meaning that it is quantitative and continuous. *Transformational development*, in contrast, refers to change in structure, form, or organization that results in the emergence of novelty. This kind of

development is qualitative and discontinuous. It is directed towards increasing complexity, understood in terms of pattern rather than additive elements, and often described in terms of stages or levels following an invariant order or sequence.

Regarding the organizing principle of Integrative Levels of Knowing, the most important cognitive-developmental theories and models are those concerned with transformational developmental change in terms of orthogenetic directionality since they present the constitutive feature of a logic of development. Among them, four of the most influential research traditions on human development will be described in more detail in the next section.

4.1.2 Strong and Weak Conceptions of Integrative Levels of Knowing

The idea of a hierarchically ordered sequence of forms of knowing or ways of thinking for both individual and collective development has a significant but not uncontested history (Kleineberg 2017). For good reasons many theories of development from the 18th and 19th centuries are rejected due to a naive and contrafactual progressivism claiming a certain necessity of linear change directed towards betterment along a path supposed to be predetermined for human beings all over the world (Trigger 1998; Carneiro 2003; Sanderson 2007). But it is important to distinguish different claims of developmental theories and to identify constitutive properties in contrast to unnecessary assumptions (Van Haaften 1997b). In this section, more elaborate traditions of developmental theories will be discussed in order to show to what extent conceptions of Integrative Levels of Knowing can still be used fruitfully today, even though strong and weak versions need to be distinguished. This discussion of theoretical traditions is also intended to offer a background orientation regarding various models of Integrative Levels of Knowing that will be introduced in the follow-up sections.

According to an overview of theories of human development provided by Newman and Newman (2016), research traditions that are concerned with the logic of development include

cognitive-developmental theory rooted in genetic structuralism (e.g., Jean Piaget, Lawrence Kohlberg, Robert L. Selman), *psychosocial theory* rooted in analytic ego psychology (e.g., Erik H. Erikson, Jane Loevinger), *cognitive social-historical theory* rooted in the cultural-historical school of Russian psychology (e.g., Lev S. Vygotsky, Alexander R. Luria, Alexei N. Leontiev), and *dynamic systems theory* also known as relational developmental systems theory (e.g., Kurt W. Fischer, Willis F. Overton, Richard M. Lerner). Despite their different origins, all of these research traditions present a conception of Integrative Levels of Knowing.

Cognitive-Developmental Theory

The tradition of cognitive-developmental theory—here understood as a specific school of thought since all presented theories in this section are concerned with cognitive development—is stimulated particularly by the work of Jean Piaget. Far from being a mere child psychologist, Piaget establishes the discipline of genetic epistemology concerned with the origin and development of new forms of knowing rather than the development of individuals. Therefore, his analytical unit is what he calls in Kantian terms the "epistemic subject" (Piaget 1977, 738) meaning the knowing human being in general or the aspects that are common to all individual subjects at the same level of development, in contrast to the psychological subject represented by empirical individuals. In other words, Piaget is primarily interested in nomothetic reconstructions of general patterns or regularities rather than in idiographic descriptions of individual or cultural peculiarities (Chapman 1988; Lourenço 2016).

In contrast to a more or less passive development considered by nativism or maturationism, Piaget's genetic or developmental structuralism assumes that knowing is an active process of achieving a balance of organized structures called equilibrium. Such an equilibrium is not a constant state but only temporary since the underlying structures or cognitive schemes are partial and imperfect. For Piaget, cognitive development is a two-sided

adaptation process between assimilation and accommodation. While *assimilation* means the interpretation of new experiences in terms of existing schemes, *accommodation* refers to the modification of these schemes in order to account for new aspects of an experienced object or event that are revealed (Newman and Newman 2016). In this process, lower and higher forms of equilibrium can be distinguished with regard to the number and scope of cognitive operations that they make comprehensible. This concept of equilibrium allows to define development in contrast to mere change and offers "a normative standard for distinguishing more adequate forms of knowing from less adequate forms" (Chapman 1988, 8).

Piaget (1977) characterizes stages of intellectual development as follows. First, there is a *constant order* of succession of stage acquisitions. This invariant sequence needs to be distinguished from mere chronological change that is extremely variable since it depends on previous experiences of the individuals and the social milieu that can accelerate, retard, or even prevent the appearance of a new developmental stage. Therefore, the mean ages of individuals operating at a given stage are essentially relative to the investigated populations. Second, there is an *integrative character* of stages. Structures or cognitive schemes of a given stage become an integral part of the following stage which constitutes new structures but rests on the older ones. Third, there is a *structure of the whole* that characterizes a given stage. This means that a stage is not presented by a juxtaposition of unrelated properties but by a multiplicity of distinct operations that can be reduced to a collection of underlying operatory schemes. Fourth, there is a phase of *preparation* in the acquisition of a stage that precedes the completion of a full stage or relative equilibrium. Phases of preparation typically take several years and later acquisitions can bear on more than one stage with varied overlaps. And fifth, it is important to distinguish in every stage sequence the genesis or *process of formation* from the *forms of equilibrium* since only the latter constitute the structures of the whole. A

distinction that is also emphasized by Habermas's opposition between the dynamics of development and the logic of development.

Although Piaget considers the conception of developmental stages as an indispensable instrument for the analysis of formative processes, he emphasizes that different dimensions of growth, corresponding to developmental *lines* of the AQAL framework, must be taken into account. He compares the multiplicity of functions in the growth of an organism with relatively independent developments (e.g., dental age, skeletal age, cerebral age, endocrinal age) to the functionally differentiated growth of cognition. Since an individual develops unevenly in different dimensions or lines and since competences acquired at lower stages are not lost but integrated at higher ones, Piaget (1977, 818) strongly rejects the assumption of a structural unity of the person:

> I have nowhere seen structural unity, at any stage of development of the child. Neither do I see it in most adults. I am myself a multiple personality, divided and contradictory. In certain cases, I force myself to be a serious man, as in professional situations. But in other situations I am infantile or I behave like an adolescent.

In this light, many criticisms of Piaget's conception of developmental stages appear to be based on misunderstanding (Chapman 1988; Lourenço and Machado 1996; Kesselring 2010; Lourenço 2016). In particular, the accusation that his stage theory is overly general and does not consider domain-specific developments, individual differences, and cultural influences seem to be unjustified to the extent that they ignore Piaget's primarily epistemological research interest focusing on the nomothetic reconstruction of the epistemic subject.

Concerned with the epistemological question of the origin and development of knowledge, Piaget arrives at the conclusion that abstract entities like logico-mathematical phenomena should not be located in a preexisting reality and thus completely outside of the subject, neither in the form of an outerworldly Platonism nor in the form suggested by the "so-

called linguistic solution" (Piaget 1977, 819) because this cannot explain the occurrence of regular stages of assimilation. Piaget criticizes the linguistic determinism claiming that the child acquires knowledge solely by cultural transmission mediated by language because it should be expected that the preexisting social reality penetrates the child's mind either as a unit or at random. The fact that the child assimilates external realities in a stage-like order can be better explained, according to Piaget, if cognitive operations including logico-mathematical phenomena are considered to be the most developed forms of the coordination of actions rooted in preverbal sensorimotor activities. Therefore, Piaget emphasizes the active role of the subject in the development of new forms of knowing.

Within the tradition of cognitive-developmental theory, Piaget's stage model presents the foundation of many empirically tested stage models in other domains of developmental psychology, such as Lawrence Kohlberg's (1983) moral reasoning, Robert L. Selman's (1980) social perspective taking, Michael J. Parsons's (1987) aesthetic judgment, or James W. Fowler's (1991) faith, whereas the so-called Neo-Piagetian research focuses more on adult development and the reconstruction of postformal stages beyond formal operations (Dasen and Ribaupierre 1987; Demetriou et al. 1992; Sinnott 1998; Young 2011). Based on the dialectic between individual and society, as described in the previous chapter, Piaget's stage model is also adapted in theories on social evolution or collective development (Harten 1977; Hallpike 1979; Döbert 1981; Habermas 1984; Miller 1986; Oesterdiekhoff 1992; Damerow 1996; Barnes 2000; Wilber 2000; Bammé 2011; Dux 2011).

Psychosocial Theory

The tradition of the psychosocial theory is concerned with ego-identity development as a result of the continuous interaction between the individual and the society reflected in self-understanding, identity formation, social relationships, and worldview. As one of the most

influential representatives, Erik H. Erikson builds on psychoanalytic theory and Sigmund Freud's psychosexual stages (i.e., from oral to anal to phallic to latent to genital) but considers the whole life span of an individual and is first and foremost interested in the skills necessary to participate in social life (Newman and Newman 2016).

His concept of stages of development refers to patterns of changes in self-concept or ego identity based on the epigenetic principle meaning a biological ground plan of growth in which each stage develops at its proper time, emerging from the previous stage without replacing it. Erikson (1980, 95) describes ego-identity development as an evolving configuration of successive ego syntheses and re-syntheses: "Ego identity, then, develops out of a gradual integration of all identifications, but here, if anywhere, the whole has a different quality than the sum of its parts." While each stage is qualitatively distinct and characterized by a dominant way of understanding regarding self, society and world, a transition from one stage to another entails a potential crisis because of a radical change in perspective. In normal or healthy development, these phase-specific psychosocial crises can be resolved by the growing personality but sometimes there occur disturbances that can lead to retardations and even phase-specific pathologies (Erikson 1980; see also Wilber 1999).

The different functions of psychosocial development (e.g., basic trust, autonomy, initiative) appear in characteristic life periods of an individual and will be integrated typically in an orderly sequence (see Table 4.1).

Table 4.1 Stages and components of psychosocial development.

	Component 1	Component 2	Component 3
Stage I	Basic trust	(earlier form)	(earlier form)
Stage II	(later form)	Autonomy	(earlier form)
Stage III	(later form)	(later form)	Initiative

Source: Modified after Erikson (1980, 55: Figures I, II [underlines added, M.K.]).

Erikson's model of ego-identity development describes eight different stages of psychosocial development (cp. Appendix D: Tables D.10, D.21). The sequence of stages presents a gradual differentiation and integration of components or functions, indicated in Table 4.1 by the diagonal of underlined items. All these components are systematically related to each other and exist in some form before and after their own critical time. But in contrast to Piaget's *structural stages*, which could be compared to the vertical dimension of a single component, Erikson's stages are best described in terms of *functional phases* since they rely on specific developmental tasks in certain periods of life and the cumulative capabilities of an individual to resolve them. Thus functional phases are representative of different ego functions or components in response to different tasks, whereas structural stages present different ways of thinking in response to a single function or task, such as logical reasoning or moral judgment (Kohlberg, Levine, and Hewer 1983). This difference is important because developmental tasks, as well as the nature and number of life periods (e.g., infancy, childhood, adolescence, adulthood) and the corresponding social expectations may vary from culture to culture. This means that the sequence of functional phases does not necessarily present a context-independent logic of development, which is considered to be constitutive for the conception of Integrative Levels of Knowing in the proper sense.

Therefore, structural stages and functional phases need to be carefully distinguished. According to Snarey, Kohlberg, and Noam (1983), *functional phases* present a hybrid form with

characteristics of both *structural stages* (logic of development) and *cultural age* (context-dependent change) (see Table 4.2).

Table 4.2 Characteristics of structural stage, functional phase, and cultural age conceptions.

Structural stage	Functional phase	Cultural age
Development versus aging		
Stages are not based on particular ages, although it is generally possible to give modal age ranges for each stage. Chronological age does not guarantee a corresponding stage of development; some adults are fixated at stages typical of children and a precocious child may be more mature than age would predict.	Phases are based on the synchronization of structural development (stage change) and cultural aging (aging in the context of cultural expectations). Similar to ages, they are somewhat inevitable; the next phase comes in a maturational sequence. Similar to stages, the successful resolution of later tasks is partially dependent on the resolution of prior developmental crises.	Periods, as times of stability and transition in the life cycle, are critically linked to age. All societies divide their membership into age categories (e.g., infant, lap child, yard child, elder). These function as taxonomic devices to organize the process of status and role changes within the life cycle and to establish the person's participation in society in a way that takes into consideration maturation, physical energy, and needs.
Qualitative versus quantitative		
Stages represent distinct qualitative structural differences in thinking about and orienting one's self to the world. A child's developmental stage is not simply an immature version of adult meaning making, but is a general organizing tendency that is truly different from adults. Stages are total ways of thinking, qualitatively consistent from one task to the next and qualitatively different from other stage approaches to the same task.	Phases involve both qualitative and quantitative change. For instance, as a result of qualitative changes in cognitive structures and quantitative changes in social status, the individual is faced with a new developmental task in ego functioning.	Culturally defined periods put much greater emphasis on quantitative changes in age, mastery, performance, knowledge, rights, and responsibilities. Puberty rites, for instance, often involve exposure to greater quantities of stress and knowledge than a younger person is permitted to experience.
Hierarchical versus nonhierarchical		
Stage sequences are hierarchical. A higher stage is constructed on the previous stage, reintegrating it into a more highly differentiated, flexible, and complex stage. Later stages are more adequate than earlier stages since they include earlier stage patterns, resolve the same problems better, and are more justifiable in terms of the universal inclusiveness of their ordering of experience.	Later phases are more adequate than earlier phases, not necessarily in terms of complexity, but in terms of their ability to give order to or make sense of one's life in a form that is stable and meaningful.	Age periods are relatively nonhierarchical. It is difficult to say that a later period is more adequate than an earlier one because attainment of and the adequacy of performance at a particular age period are distinct. Furthermore, the period that society defines as life's best time varies from culture to culture.

(continued)

Table 4.2 Characteristics of structural stage, functional phase, and cultural age conceptions.

Structural stage	Functional phase	Cultural age
Invariance versus variation		
Stages are invariant; each stage develops out of the previous one and a person must progress up the hierarchy one step at a time, without skipping or reversing any of the stages. Although an individual may become fixated at a particular stage, or even regress, all forward progress requires an invariant sequence of development in accord with the stage hierarchy. Environmental factors and innate capabilities may help one person reach a given stage of development earlier than another, but all people go through the same stage sequence.	The achievement of earlier phases or the resolution of previous crises serves as a foundation for new phases. Later phases subsume earlier phases. The successful achievement of later tasks is partially but not completely dependent on the successful achievement of earlier tasks. The specific sequence of adjoining phases may be reversed or difficult to distinguish among some individuals in our culture and many individuals in some other cultures.	Cultural ages vary in sequence between cultures and between subcultures within a particular culture. The accepted sequence in one sociocultural system may be reversed or absent in another. Even such generally defined periods as adolescence or the elderly can be absent where the culturally defined life cycle takes a person directly from late childhood into adulthood or where a person does not reach full adulthood until very late in life.
Universal versus relative		
Stages are structurally universal phenomena. Stage theories form an international road map predicting the sequential development of the ability to structure or make sense of the world. All persons, regardless of their sociocultural setting, can be expected to go through the same stages. The order of forward movement is universal, although individuals raised in different environments will no doubt progress through the stages at varying rates.	Phases are neither as universal as stages nor as relative as cultural ages. More plastic than the former and firmer than the latter, phases address both the commonality and uniqueness of personal experience and developmental conflicts.	Cultural age periods are local road maps that predict the contents one will be concerned with during various ages of life in that particular culture. Periods cannot be universal since they vary tremendously from one culture to another. The relativity of age periods between cultures, however, also implies a general uniformity within a culture or subculture.

Source: Excerpted from Snarey, Kohlberg, and Noam (1983, 328–30: Table 2 [underlines added, M.K.]).

However, more recent research within the psychosocial tradition does not only expand the number of stages but focuses much more on the formal or structural aspects of development (Kegan 1982; Loevinger 1983; Cook-Greuter 2010a). As emphasized by Kohlberg, Levine and Hewer (1983), structural characteristics can be derived from functional phases, even though not all criteria for developmental stages, as described by Piaget, can be met. Therefore, these authors make a further distinction between "hard structural stages" and "soft structural stages" (Kohlberg, Levine, and Hewer 1983, 33). The concept of *hard structural stages* refers to

developmental stages in the Piagetian sense defined by a formalization of thought operations that manifest themselves in actual symbolically mediated responses of individuals to problems, conflicts, or tasks. By comparison, *soft structural stages* refer less to a way of thinking or form of knowing but more to the structure of fairly stable personality functions and contents that involves a consciously reflecting ego or self as source of a totalistic meaning-making or worldview (cp. Perry 1968; Fowler 1981; Gilligan 1982; Kegan 1982; Loevinger 1983). Unlike structures of thought operations, structures of the ego or "self-system" (Loevinger 1983, 347) cannot be observed directly and abstracted in formalizations but can only be hypothetically constructed and described in terms of ideal types, illustrative exemplars, or "prototypes" (Loevinger 1983, 344). Such ideal-typical representations of stages, however, are partly described in terms of structures but also in terms of function, content, and motives regarding the whole personality.

As argued by Kohlberg, Levine and Hewer (1983), this mixture leads to some important differences compared to hard structural stages. First, the varying contents of reflection (e.g., self, society, nature, the ultimate) may lead to an uneven development across these different content domains or developmental lines and this would remain undifferentiated in the more or less global stages of ego-identity development. Therefore, the increasing complexity of conscious reflectivity related to soft structural stages should not be conflated with Piaget's concept of "reflective abstraction" (Kohlberg, Levine, and Hewer 1983, 35) describing a more or less unconscious transformation of a structure of the whole to the next higher stage regardless of the content of reflection. Second, the lack of differentiation between structure and content leads to an ambiguous distinction between competence and performance since competence needs to be described in terms of structure. Third, the sequence of stages is cumulative rather than transformational since new stages are characterized by an addition of new developmental aspects without taking recourse to underlying operations of reasoning and

their hierarchical integration. Fourth, the ambiguity of the inner logic of the stage sequence makes it more difficult to formulate a normative model of development that establishes a justification why a higher stage can be considered to be a more adequate stage. And fifth, the lack of a normative model of development prevents the conception of a developmental endpoint upon which all rational actors could agree. The latter point, however, can also be seen as an advantage since it allows the conception of stages of mature adulthood that go beyond criteria of rationality, which are often termed *postrational*, *postrepresentational*, *transcendental*, or *transpersonal* (cp. Appendix B: Tables B.1, B.10, B.15, B.16, B.45, B.46, B.47; Appendix D: Tables D.15–D.30).

Given these analytical distinctions, the present study considers both hard structural stages and soft structural stages, in opposition to mere functional phases, as conceptions of Integrative Levels of Knowing but not without the qualification of a strong and a weak version. The *strong conception* based on hard structural stages has the advantage of a precise articulation of the inner logic of the developmental sequence but the disadvantage that the stage descriptions reflect only a small part of the personality. By comparison, the *weak conception* based on soft structural stages has the advantages of a less abstract and much more vivid description of the growing personality and a more adequate account of adult development but the disadvantage that the presumed logic of development appears to be less well justifiable. This is because a reconstructed sequence of soft structural stages is primarily based on empirical findings and much less on the rational reconstruction of abstract operations that are *a priori* built on lower-level operations (Kohlberg, Levine, and Hewer 1983; Korthals 1997b).

In opposition to hard or soft structural stages, functional phases are not considered to be conceptions of Integrative Levels of Knowing since their lack of a context-independent logic of development makes them less suitable for a systematic organization. Developmental models

based on functional phases are presented, for example, by Erich Neumann's (1954, XV) "archetypal stages," Abraham Maslow's (1943, 386) "hierarchy of basic needs," or Clare W. Graves's (1970, 131) "levels of existence." These models can be correlated to some extent to models based on structural stages but it should be noted that such attempts are merely based on age-related correlations and not on structural isomorphisms (see Appendix D: Tables D.21, D.25).

Cognitive Social-Historical Theory

The tradition of the cognitive social-historical theory is concerned with the social and cultural basis of thinking and emphasizes the role of cultural tools, such as language and other symbolic systems (e.g., counting systems, diagrams, pictorial systems), as means of the development of higher-order mental processes. Its origins are rooted in the cultural-historical school of Russian psychology that includes members like Alexander R. Luria, Alexei N. Leontiev, and the influential Lev S. Vygotsky (Newman and Newman 2016).

Vygotsky's developmental model is often described as opposite to Piaget's approach while both are stylized to a kind of individual-social antinomy (cp. Cole and Wertsch 1996; Matusov and Hayes 2000; Lourenço 2012). But the supposed clear-cut difference between a Piagetian individualism and a Vygotskian collectivism needs to be rejected since both theorists present a much more balanced "relational perspective" (Lourenço 2012, 283) that acknowledges individual and social influences. In fact, Vygotsky shares some important similarities to Piaget regarding the conception of developmental stages, most importantly, a genuine genetic or developmental perspective concerned with transformational change directed towards increasing complexity (Overton 2006; Lourenço 2012; Newman and Newman 2016).

Vygotsky distinguishes between lower mental processes (e.g., spontaneous concepts, comparable to Piaget's sensorimotor and preoperational cognition) developing more or less naturally in the child and higher mental processes (e.g., scientific concepts, comparable to Piaget's concrete- and formal-operational cognition) that develop in an interpersonal context as the child interacts with others and learns to master the cultural tools of its social environment. Consequently, higher cognitive functions in the child's development appear first on a social plane between people (interpsychological) and then inside the child (intrapsychological). Since the cultural-historical context may vary, the child's development is considered to be a "product of social history" (Luria 1976, 10).

At this point, it is important to note that the cultural-historical school of Russian psychology is based on the philosophy of Marxism in the form of historical materialism (Newman and Newman 2016). According to this doctrine, social differences are not simply considered to represent different culturally relative ways of life but rather different developmental stages in the history of societies as such. As noted by Matusov and Hayes (2000, 218), this assumption of a directed development is also reflected in terminology:

> In Russian, the word "kul'tura" has more connotation with art, literature, technology, education, and even quality [...] than with ways of life, as the word "culture" usually connotes in English.

In other words, culture is considered to be a matter of degree along a continuum or developmental sequence. It is supposed that there are lower and higher culturally developed societies and that these different cultural environments have an impact on the rate and the expected endpoint of the child's cognitive development. But the decisive point is that the sequence of developmental stages for all individuals remains invariant regardless of the cultural-historical context. For this reason, Matusov and Hayes (2000, 224) conclude that Vygotsky is a universalist who believes that rationality, logic, and scientific thinking have

universal applicability. Logic is not based on a context-specific activity but, on the contrary, presents an abstraction, or in Vygotsky's words, a *deliberation* from the context.

This nomothetically oriented research interest is also characteristic for Vygotsky's (1986, 187) concept of the "zone of proximal development" since it already implies a logic of development. The zone of proximal development describes the distance between the actual developmental level of an independently problem-solving child and the potential developmental level of the child when guided by an adult or more advanced instructor. For any child in any context, however, the next higher level of development is predetermined by the invariant sequence of stages or levels. For example, Vygotsky (1986) reconstructs such an invariant sequence for concept development from syncretic images to thinking in complexes (pseudoconcepts) to potential concepts, and finally to true concepts (see also Kleineberg 2012; Appendix B: Table B.44). Since earlier developmental stages are not completely superseded by later ones but still available for the developing person, Vygotsky (1986, 140) also presents a conception of Integrative Levels of Knowing:

> Different genetic forms coexist in thinking, just as different rock formations coexists in the earth's crust. [...] Even after the adolescent has learned to produce concepts, he does not abandon the more elementary forms; they continue for a long time to operate, indeed to dominate, in many areas of his thinking.

From a methodological point of view, it should be noted that more recent approaches within the cognitive social-historical tradition, such as the Cultural Historical Activity Theory (CHAT) and some approaches of cross-cultural psychology, tend not only to reject the underlying historical materialism as Marxist ideology but also to lose interest in nomothetical questions (Cole 1976; Roth and Yew-Jin Lee 2007). The premise that social environments and cultural tools shape the child's cognitive development is still considered to be fundamental, whereas the assumption that social environments and cultural tools themselves can be defined in

developmental terms is often questioned (Matusov and Hayes 2000). But this lack of a genetic or developmental perspective on social evolution or the collective dimension leaves an open question because the assumption that the individual's higher cognitive functions originate from the social plane does only displace the problem. The question, then, is how these collectively shared higher forms of knowing have come into being in the first place. Without taking recourse to a developmental sequence of social evolution, it would not even make sense to speak of lower and higher forms of knowing. This genetic or developmental perspective, originally emphasized by the cultural-historical school of Russian psychology, is taken more seriously again by some approaches that are deeply inspired by Vygotsky's work and still interested in a nomothetic reconstruction of a logic of development (Tomasello 1999; Donald 2001).

Dynamic Systems Theory

The tradition of dynamic systems theory emphasizes the interdependence of genetic, neural, behavioral, physical, cognitive, social, and cultural influences on human development in order to provide an overarching explanatory framework. In relation to the AQAL framework, dynamic systems theory considers more explicit than the other introduced theories developmental change as a nonlinear and probabilistic outcome of the interaction of *all* quadrants and *all* levels. As a non-reductionist attempt, it seeks to integrate important insights from as much as possible existing developmental approaches by taking both universal structures and contextual variability into account (Overton 2007; Witherington 2007; Lerner 2011; Newman and Newman 2016).

A system (e.g., a molecule, a neuron, an organ, an individual, a family, a corporation) is defined as a whole of interdependent elements or parts that share some common goals, functions, and boundaries. Such a system can be regarded as an *open system* to the extent that

its organization, function, and identity is maintained even when their parts continuously change. A *dynamic system* is characterized by an evolving self-organization and the emergence of novelty in terms of new properties or behavior. As summarized by Newman and Newman (2016, 319), three criteria are important for the notion of self-organization and the "emergence of order and new levels of complexity." First, the levels of organization should be qualitatively distinct before and after self-organization takes place. Second, the level of complexity in the system should increase. This means that more information is required to predict the behavior of the system. And third, the new organization should be to a significant degree internally caused and not merely the result of external forces.

In order to avoid a linear understanding of development, the common metaphor of the ladder is sometimes replaced by the notion of an "emergent developmental web" (Mascolo and Fischer 2010, 163). The metaphor of the web highlights context-specific variation of activity within a global order. Variability of behavior across tasks and domains, as well as across individuals and groups is acknowledged while at the same time it is assumed that "higher-order psychological structures emerge from the integration or coordination of lower-order structures" (Mascolo and Fischer 2010, 163). Development is considered to be a complex network of distinct pathways or trajectories, corresponding to *lines* in the AQAL framework, that can move in diverging or converging directions allowing both forward progression and backward transitions. It is presumed that a person is able to function at multiple levels at a given point in time depending on the context (e.g., domain, task, support, time of day, emotional state). This also means that the *level of competence* and the *level of performance* is not necessarily the same. Similar to Vygotsky's notion of the zone of proximal development, the level of performance (e.g., automatic, functional, optimal, scaffolded) is considered to be highly dependent on the social context and the provided support by advanced instructors (Mascolo and Fischer 2010).

However, it is important to note that the variability illustrated by the metaphor of the web refers to the *dynamics of development* or the process of formation of psychological subjects, whereas the metaphor of the ladder is supposed to represent the *logic of development* or the forms of equilibrium of epistemic subjects. This distinction is also reflected by Michael F. Mascolo's and Kurt W. Fischer's (2010, 168) opposition between "historical change" in the sense of change-over-time across the life span and "developmental change" as a transformation directed towards higher levels of complexity.

In short, all four introduced research traditions concerned with human development present a developmental-logical conception of cognitive growth, that is, a strong or weak conception of Integrative Levels of Knowing. Although the emphasis is often put differently and some controversial issues remain, the shared nomothetical interest in the reconstruction of general patterns and regularities, such as invariant sequences of developmental stages, contribute significantly to a cognitive-developmental understanding of epistemic pluralism. It cannot be emphasized enough that these research traditions do not present any kind of progressivism. Instead, they underline the dialectics of progress, as well as the analytical distinction between the dynamics and the logic of development. The actual *dynamics of development* is non-linear, to some extent contingent, even reversible, and thus context-dependent. By comparison, the *logic of development* presents the result of a reconstruction after the fact in terms of developmental sequences that are supposed to be invariant or linear and thus context-independent, as long as these generalizations are not challenged by empirical findings. In the next section, some of the most elaborate developmental-logical models of cognitive development will be introduced as potential means for knowledge organization.

4.2 Models of Integrative Levels of Knowing

4.2.1 Individual Development

After discussing major research traditions that use theoretical conceptions of Integrative Levels of Knowing, the focus is now on empirically tested models derived from these traditions. Each one of these developmental models presents a small classification of domain-specific forms of knowing and a collection of these models may help to reduce the complexity of epistemic pluralism. As a means of knowledge organization, the developmental sequences of these models can be considered to be documentary languages or controlled vocabularies that may contribute to a systematic organization of the epistemological dimension of human knowledge.

In this regard, three main steps are important. First, the *domain of knowing* needs to be specified. As argued above, there is no global development of the person as a whole but development takes place along domain-specific and largely independent developmental lines. Therefore, the domain of cognitive competence (or skill, task, function) must be determined, such as logico-mathematical reasoning, moral judgment, or aesthetic experience. Second, the variation in contents needs to be reduced to structural types or *forms of knowing*. For example, moral judgment varies from culture to culture in that it is oriented on highly context-specific conventions but with regard to the underlying cognitive structures, there are also some abstract characteristics that describe cross-cultural forms of moral judgment, such as Kohlberg's preconventional, conventional, and postconventional moral views (Kleineberg 2018). And third, the remaining differences between forms of knowing need to be explained genetically as differences in the stage of development or *level of knowing*. This last step is decisive for the use of the developmental sequences of these models as documentary languages and marks the distinction between typologies and classifications. While forms of knowing present mere typologies of qualitative distinct types based on shared abstract characteristics (Bliss's strategy of collocation), levels of knowing present genuine classifications

that additionally provide internal relations between these types or classes in terms of genus-species or part-whole hierarchies (Bliss's strategy of subordination).

Some of the most elaborate models of Integrative Levels of Knowing in individual development are derived from literature analysis and collected in Appendix B with detailed descriptions of their particular level characteristics. These models present promising tools for viewpoint indexing in the field of knowledge organization (see Table 4.3).

Table 4.3 Domain-specific models of Integrative Levels of Knowing in individual development.

Domain of knowing	Reference	Appendix
Consciousness (according to Vedic psychology)	Alexander et al. (1990)	Table B.1
Ethical reasoning	Armon (1984)	Table B.2
Value	Beck and Cowan (1996)	Table B.3
Religious representation	Bellah (2011)	Table B.4
Epistemology	Benack (1984)	Table B.5
Interpersonal reasoning	Blanchard-Fields (1989)	Table B.6
Natural philosophy	Broughton (1978)	Table B.7
Representation	Bruner (1974)	Table B.8
Tasks	Commons (2008)*	Table B.9
Ego identity	Cook-Greuter (2010a)*	Table B.10
Thought	Demetriou et al. (2017)	Table B.11
Naming and knowing	Dewey and Bentley (1949)	Table B.12
Understanding experiences of beauty	Diessner et al. (2016)	Table B.13
Religious orientation	Diperna (2018)	Table B.14
Self	Esbjörn-Hargens and Zimmerman (2009)	Table B.15
Ecological identity	Esbjörn-Hargens and Zimmerman (2009)	Table B.16
Faith	Fowler and Dell (2006)*	Table B.17
Communicative action	Habermas (1979)	Table B.18
Interactive competence and moral consciousness	Habermas (1979)	Table B.19
Ego identity	Habermas (1979)	Table B.20

(continued)

Table 4.3 Domain-specific models of Integrative Levels of Knowing in individual development.

Domain of knowing	Reference	Appendix
Interaction, social perspective and moral judgment	Habermas (1979)	Table B.21
Leadership agility	Joiner (2011)	Table B.22
Self	Kegan (1982)	Table B.23
Consciousness and curricular complexity in history	Kegan (1994)	Table B.24
Reflective judgement	King and Kitchener (1994)	Table B.25
Moral judgement	Kohlberg (1976)*	Table B.26
Cognition	Koplowitz (1984)	Table B.27
Social cognition	Kramer (1989)	Table B.28
Self-representation	Labouvie-Vief et al. (1995)	Table B.29
Knowing	Lewis (2015)	Table B.30
Ego identity	Hy and Loevinger (1996)	Table B.31
Counting, story-telling, and drawing	Mascolo and Fischer (2010)*	Table B.32
Religious judgment	Oser and Gmünder (1991)	Table B.33
Aesthetic experience	Parsons (1987)*	Table B.34
Intelligence and ethics	Perry (1968)*	Table B.35
Logico-mathematical reasoning	Piaget (1999)*	Table B.36
Classification	Inhelder and Piaget (1964)	Table B.37
Social perspective-taking	Selman (1980)*	Table B.38
Social perspective-taking and interpersonal action	Selman (2003)*	Table B.39
Tasks in physics	Stålne, Commons and Li (2014)	Table B.40
Reasoning about the AQAL framework	Stein (2010)	Table B.41
Personal action-logics	Torbert (2003)	Table B.42
Social conventions	Turiel (1983)	Table B.43
Concept formation	Vygotsky (1986)	Table B.44
Consciousness	Wade (1996)	Table B.45
Mind	Wilber (2000)	Table B.46
Transpersonal mind	Wilber (2017)	Table B.47

* *Models that are exemplarily described in the main text.*

In the following, some examples of these domain-specific models of individual development will be introduced in more detail to determine their particular domains of knowledge, to name their reconstructed developmental sequences, and to give some hints regarding the empirical evidence.

Piaget's Model of Logico-Mathematical Development

Arguably, the most influential developmental model, not only in the tradition of cognitive-developmental theory but in cognitive psychology in general, is presented by Jean Piaget. After four decades of genetic studies, Piaget (1977, 352) summarizes the main finding that, at a level below conscious reflection and prior to language, there is a "logic of coordinations of actions." This logic comprises, among other things, relations of order and inclusion that regulate actions and, at later stages of development, also regulate thought (i.e., internalized actions). Concerned with the development of intelligence, Piaget (1977, 352) concludes that logical operations, as known from adult thinking, present a higher form of these sensorimotor regulations: "Logico-mathematical activities are thus to be conceived psychologically as an inexhaustibly fruitful prolongation of the coordination of actions." An operation transforms a state A into a state B, leaving at least one property invariant (conservation) and allowing the possibility of return from B to A (reversibility). An example of the reversibility of operations is that the action of uniting (addition) can be inversed into the action of dissociating (subtraction). Piaget's (1977) studies show, however, that a child who is able to internalize an action and to imagine the results is not necessarily capable to visualize the reverse action due to a lack of conservation. For example, in his famous experiment with a ball of clay that is manipulated and formed into a sausage, a pancake, or a number of pieces, younger children are not yet able to conserve the notions of substance, weight, and volume throughout the transformations. Consequently, these children are not yet able to return to the point of

departure by anticipating in thought the reverse action, which is why their thinking remains preoperational. Genuine operational thinking appears first at the level of concrete operations (e.g., logic of classes and relations) and later as second-degree operations or thinking on thinking at the level of formal operations (e.g., logic of propositions). Although Piaget acknowledges that there is more to thinking than logic, he considers the stages of logical thinking to be foundational for various other aspects of thinking, such as conceptions of time, space, geometry, speed, chance, and probability (Inhelder and Piaget 1958; Piaget 1977).

From an empirical point of view, Piaget's research is based on his so-called clinical method, that is, a combination of standard intelligence tests and open-ended conversations that include experiments on problem-solving tasks. Starting with the study of his own three children, empirical research soon expands into more comprehensive cross-sectional and longitudinal studies with Geneva children. Today Piagetian research is well-documented and includes many cross-cultural studies (Dasen and Ribaupierre 1987; Molitor and Hui-Chin Hsu 2011; Oesterdiekhoff 2013) and even cross-species studies (Langer 1988; Parker and McKinney 1999). Despite some legitimate criticisms, the findings tend to confirm the universality of the stage sequence, even though there are asynchronous developments in specific domains and differences in the rate and endpoint of development (Lourenço 2016). Although the logico-mathematical formalizations appear to be too narrow to characterize stages of cognitive development as a whole, they indicate important milestones in that particular domain. Piaget reconstructs the following sequence of integrative levels of intelligence or logico-mathematical reasoning (see Appendix B: Table B.36):

1. Sensorimotor
2. Preoperational
3. Concrete operations
4. Formal operations

Kohlberg's Model of Moral Development

One of the best-known models within the tradition of cognitive-developmental theory is presented by Lawrence Kohlberg's moral stages. Kohlberg (1971) considers himself as both a moral psychologist and a moral philosopher because he attempts to combine empirical findings on moral development with normative evaluations regarding the adequacy of moral views. This division of labor is important in order to avoid the naturalistic fallacy, that is, the premature conclusion "from is to ought" (Kohlberg 1971, 151). As emphasized by Kohlberg, Levine and Hewer (1983), this normative dimension of the evaluation of moral judgments should not be mistaken as a measure of the moral worth of individuals. The research interest focuses on the cognitive aspect of moral understanding and rational moral judgment based on general rules and principles, leaving aside affective and motivational aspects and questions of moral actions.

According to Kohlberg (1976), the stages of moral judgement parallel Selman's (1980) stages of social perspective or role-taking concerned with the way how individuals differentiate their perspectives from other perspectives and relate these perspectives to one another. Kohlberg (1976, 173) assumes that both moral judgement and social role-taking are based on a more general structural construct that is conceptualized as "socio-moral perspective" referring to the point of view taken by an individual in defining social facts and sociomoral values. Kohlberg, Levine and Hewer (1983) also acknowledge Carol Gilligan's (1982) distinction between a moral orientation on justice (e.g., fairness, rightness, duty) and a moral orientation on care (e.g., responsibility, loyalty, obligation), even though they consider this not as a distinction between two separate general moralities but rather between two different ways or preferences of moral considerations, corresponding to *types* in opposition to *lines* of the AQAL framework (cp. Kegan 1982; Wilber 1999). Kohlberg, Levine and Hewer (1983) argue that justice reasoning is more likely to be rationally reconstructable compared to the ethics of care

taking place in the sphere of personal decisions and special relationships to family, friends, and group-members (cp. Habermas 1990).

Empirical studies concerned with Kohlberg's sequence of justice reasoning show that the postconventional Stage 5 seems not to be developed in all cultures or in the majority, for instance, of the US adult population (Gibbs et al. 2007), while Stage 6 cannot be detected at all by longitudinal studies and seems to be represented only by a small elite sample including thinkers like Mohandas Gandhi and Martin Luther King, or moral philosophers like John Rawls and Jürgen Habermas (Kohlberg, Levine, and Hewer 1983). Despite some controversial issues, Gibbs et al. (2007, 491) conclude in their meta-analysis summarizing 45 cross-cultural studies in 27 countries that "Kohlberg was in principle correct regarding the universality of basic moral judgment development." The assumption that justice reasoning follows an invariant sequence of stages is supported for both cultural differences as well as sex differences (Kohlberg, Levine, and Hewer 1983; Jorgensen 2006; Boom, Wouters, and Keller 2007; Gibbs et al. 2007).

Kohlberg and colleagues also consider a soft structural Stage 7 occurring after the six previous hard structural stages of justice reasoning (Kohlberg, Levine, and Hewer 1983; Kohlberg and Ryncarz 1990). This stage is characterized by a cosmic or infinite perspective attributed, for example, to Marcus Aurelius or Baruch Spinoza. Such a quasi-religious orientation, however, is larger in scope than the justice orientation because it addresses not only the question what morality can be but also the metaethical question why one should be moral at all. Therefore, this way of justice reasoning is less amenable to rational reconstructions since these require a developmental endpoint on which all rational agents could agree. Kohlberg reconstructs the following sequence of integrative levels of moral judgment or justice reasoning (see Appendix B: Table B.26):

1. Heteronomous morality
2. Individualism, instrumental purpose and exchange
3. Mutual interpersonal expectations, relationships and interpersonal conformity
4. Social system and conscience
5. Social contract or utility and individual rights
6. Universal ethical principles

Selman's Model of Interpersonal Development

Educational psychologist Robert L. Selman, a coworker of Lawrence Kohlberg, studies the development of interpersonal understanding or social cognition based on the assumption that it is based in part on stages of social perspective taking. Social perspective taking means the ability to coordinate the psychological points of view of self and other. The focus of Selman's (1980; 2003) studies lies on the developing conceptions of individual, friendship, peer-group relations, and parent-child relations and also on interpersonal action in terms of sharing experience and negotiation strategies. All of them are considered to be functions of developmental stages of the individual's coordination of social perspectives. In speaking of social cognition and action, Selman (1980, 14) uses the term "social" with reference to the assumption that the specified behavior has some meaning for the participants.

The empirical foundation is based on several cross-sectional and longitudinal studies comprising a sample of 143 interviewed persons, mainly from the US middle-class population of the 1970s and 1980s (Selman 1980; Gurucharri and Selman 1982). The data provide strong evidence for the developmental sequence of social perspective taking in which levels appear sequentially with increasing age. No person skips levels or shows regression, nothing in interview responses suggest the representation of an alternative level, and no significant sex differences can be found. As an outgrowth of the cognitive-developmental research tradition, Selman's (1980, 23) describes his approach as "strongly structural-developmental" meaning

that his model presents hard structural stages. Selman reconstructs the following sequence of integrative levels of interpersonal understanding (see Appendix B: Tables B.38, B.39):

1. Undifferentiated and egocentric
2. Differentiated and subjective
3. Self-reflexive / second-person and reciprocal
4. Third-person and mutual
5. In-depth and societal-symbolic

Parsons's Model of Aesthetic Development

As professor in art education, Michael J. Parsons is heavily influenced by the cognitive-developmental tradition and the work of Lawrence Kohlberg. Following Habermas's distinction between three different world relations (the external world of objects, the social world of norms, and the inner world of self), Parsons (1987, XIII) assumes that there are "three corresponding streams of cognitive development" and he seeks to establish, besides Piaget's focus on the external world and Kohlberg's focus on the social world, a third account of development concerned with the inner world and the aesthetic experience of the self. In his study, he investigates the understanding of famous paintings of art history in terms of subject matter, expression, medium, form, style, and judgment. Parsons considers higher stages to be more adequate than lower ones but he distinguishes between aesthetic and psychological aspects. From an aesthetic point of view, each higher stage achieves new insights and interprets paintings in a more comprehensive way than before. From a psychological point of view, the sequence of stages presents an increasing ability to take the perspective of others. In this respect, Parsons applies Kohlberg's distinction between preconventional, conventional, and postconventional views to the understanding of artworks. While these psychological aspects are characteristic for hard structural stages, the aesthetic aspects of Parsons model

should rather be considered to be soft structural stages since they present a cumulative rather than a genuine transformational sequence.

Empirically, this stage model is based on more than 300 interviews conducted as a cross-sectional study during a ten-year period in the region around Salt Lake City, US. The interviewed persons range from preschool children to art professors and present a convenience sample. In each interview five or six paintings are discussed, among them, Pierre-August Renoir's *The Luncheon of the Boating Party* (1881), Paul Klee's *Head of a Man* (1922), Marc Chagall's *La Grand Cirque* (1927), Ivan Albright's *Into the World Came a Soul Called Ida* (1930), and Pablo Picasso's *Head of a Weeping Woman with Hands* (1936). Parsons reconstructs the following sequence of integrative levels of aesthetic experience (see Appendix B: Table B.34):

1. Favoritism
2. Beauty and realism
3. Expressiveness
4. Style and form
5. Autonomy

Fowler's Model of Faith Development

Influenced by Erik H. Erikson and Lawrence Kohlberg, theologist and developmental theorist James W. Fowler studies the structural development of faith (Fowler 1981; 1996). The notion of *faith* is understood in a broad sense that extends beyond religious faith and refers to the generic process underlying the formation of beliefs, values, and meaning including secular ideologies. Faith is considered to be foundational to social relations, personal identity, and cultural meaning in that it gives coherence and direction to the life of individuals, connects them to others by means of shared trust and loyalties, offers them a sense of relatedness to a larger identity, and helps them to deal with the challenges of life and death with reliance on a

quality of ultimacy (Fowler and Dell 2006). From this point of view, faith is a cross-cultural phenomenon and its development begins in early childhood with the basic trust in bonding to caregivers.

The empirical foundation of Fowler's (1981) stage model is based on a sample of 359 interviews conducted as a cross-sectional study in the US during the 1970s and 1980s. This sample is balanced in relation to gender (male 50.1%, female 49.9%) but not in relation to ethnic groups (white 97.8%, black 2.2%) or religious orientation (protestant 45.0%, catholic 36.5%, Jewish 11.2%, orthodox 3.6, other 3.6%). Although Fowler (1981, 99) claims that his model meets "the structural-developmental criteria for stages," as defined by Piaget, Kohlberg, and Selman, it seems to present soft structural stages rather than hard structural stages (cp. Snarey, Kohlberg, and Noam 1983). Fowler reconstructs the following sequence of integrative levels of faith (see Appendix B: Table B.17):

1. Primal
2. Intuitive-projective
3. Mythic-literal
4. Synthetic-conventional
5. Individuative-reflective
6. Conjunctive
7. Universalizing

Perry's Model of Intellectual and Ethical Development

In a seminal study, educational psychologist William G. Perry (1968) investigates the intellectual and ethical development from adolescence to adulthood. The focus is on the structure or form in which individuals perceive their world rather than the particular contents of attitudes or concerns. This refers to the formal properties of the individuals' assumptions and expectancies regarding the nature and origin of knowledge and value. Of particular interest is the variety of

responses to the challenge of intellectual and moral relativism, and the notion of multiple frames of references in a pluralistic culture. Since this involves the individual's conscious worldview or totalistic meaning-making, this model presents soft structural stages. Perry identifies an invariant developmental sequence of nine epistemological positions grouped into three tiers from dualism to relativism to commitment in relativism. He argues that higher stages are more adequate than lower ones but acknowledges that his own normative statement has no absolute status but needs to be seen as relative to the context of his scheme.

The empirical foundation is based on a longitudinal study of US college students from Harvard and Radcliffe during the 1950s and 1960s. Two samples comprise 140 students and 646 interviews including 84 complete four-years reports with follow-up interviews each year. Perry reconstructs the following sequence of integrative levels of knowing and valuing (see Appendix B: Tables B.35):

1. Basic duality
2. Multiplicity pre-legitimate
3. Multiplicity subordinate
4. Multiplicity correlate or relativism subordinate
5. Relativism correlate, competing, or diffuse
6. Commitment foreseen
7. Initial commitment
8. Orientation in implications of commitment
9. Developing commitment(s)

Cook-Greuter's Model of Ego-Identity Development

Educational psychologist Suzanne R. Cook-Greuter (1990; 2010a) continues Jane Loevinger's research on ego-identity development within the psychosocial research tradition. The concept of the ego is defined as "the central processing unit that orchestrates and aims at coherent meaning" (Cook-Greuter 2010a, 26). Cook-Greuter seeks to demonstrate that the concepts of

self and reality evolve together in a developmental-logical sequence of differentiation and integration. Her underlying concept of developmental stage takes recourse to the Piagetian tradition but present aspects of both hard and soft structural stages. While her sequence of perspective-taking indicates hard structural stages, her characteristics of ego identity as totalistic meaning-making describe soft structural stages. The sequence of eleven stages is grouped into four more general tiers by adopting Kohlberg's distinction between preconventional, conventional, and postconventional views to ego-identity development and adding a further so-called postautonomous tier. Cook-Greuter's research takes the whole life span of the individual into account and is particularly interested in adult development beyond the stage of autonomous ego identity, that is, beyond the rational and representational realms of cognition. With reference to theorists of transpersonal developmental psychology, such as Charles N. Alexander (Alexander, Druker, and Langer 1990; Alexander et al. 1990) and Ken Wilber (Wilber, Brown, and Engler 1986; Wilber 2017), she identifies two postautonomous or postrepresentational stages of development. But she has to admit that such ways of thinking are hard to evaluate by means of standard scientific methods. This is even more difficult since the experience and expertise of these forms of knowing are very rare among both test persons and researchers themselves. Methodologically, she refines Loevinger's so-called Sentence Completion Test (SCT), in which test persons are ask to end incomplete sentences (e.g., "My conscience bothers me if…") in any way they like. After decades of empirical research in the form of cross-sectional studies on individuals with an age range from 16 to 82, Cook-Greuter's (2010a) database includes more than 6,800 SCT protocols with around 250,000 sentence completions. Cook-Greuter reconstructs the following sequence of integrative levels of ego identity (see Appendix B: Tables B.10):

1. Symbiotic (presocial)
2. Impulsive

3. Self-protective
4. Rule-oriented
5. Conformist
6. Self-conscious (self-aware)
7. Conscientious
8. Individualist
9. Autonomous
10. Construct-aware (ego-aware)
11. Unitive

Fischer's Model of Skill Development

Within the research tradition of dynamic systems theory, Michael F. Mascolo and Kurt W. Fischer (2010, 156) use the analytic unit of "dynamic skills" in order to reconstruct developmental change in terms of universal structures. Skills are defined as the capacity of organized actions in specific domains and contexts, such as drawing artworks, writing literary narratives, or calculating with numbers. The notion of *dynamic skills* indicates that skills are changing as they become more advanced since each skill begins in some rudimentary form of action and is able to transform along a developmental trajectory of hierarchical complexity. What develops is not the person as a whole but local skills within particular domains. However, skills in different domains can be compared in terms of structural complexity. Mascolo and Fischer (2010, 161) present a scale of behavioral complexity that offers a common measure for transformational change since "skills develop through the same abstract sequence of structural transformations across different conceptual domains." The original sequence presented by Neo-Piagetian theorist Kurt W. Fischer (1980) includes ten levels of skills grouped into three tiers from action to representation to abstraction, largely corresponding to Piaget's sensorimotor, preoperational, and formal-operational thought. For the domains of counting,

story-telling, and drawing, Fischer and Mascolo reconstruct the following sequence of integrative levels of skills (see Appendix B: Table B.32):

1. Single representations
2. Representational mappings
3. Representational systems
4. Single abstractions
5. Abstract mappings
6. Abstract systems
7. Single principles

Commons's Model of Task Development

Quite similar to Kurt W. Fischer's model of skill development with reliance on dynamic systems theory, Michael L. Commons's (2008) so-called Model of Hierarchical Complexity (MHC) refers to problem-solving behavior and structures of tasks in order to describe universal patterns of evolution and development. Behavioral tasks are broadly defined as the activity to organize or coordinate information. On one hand, this includes thinking and knowing, as Commons (2008, 305) notes: "Thought *is* action." On the other hand, entities that are able to organize information also include social organizations, non-human organisms, and even machines like computers. The MHC presents a quantitative conception of behavior presuming that tasks (e.g., adding numbers) are either completed correctly or not completed at all. But tasks may differ in their degree of complexity. For example, the task of adding numbers correctly is less complex than the task of multiplying numbers correctly since the former is a necessary precondition of the latter but not vice versa. According to Commons, the MHC's orders or levels of hierarchical complexity are grounded in objective criteria derived from mathematical models and information theory. Therefore, the analysis of task performances does not require to take recourse to the consciousness of the problem-solving entity and can be equally applied to

human and artificial intelligence. In this regard, Commons (2008, 308) distinguishes between "horizontal complexity" and "vertical complexity." *Horizontal complexity* is merely the sum of accumulated bits of information about an event in order to perform a task, as described, for example, in Shannon's and Weaver's classical information theory. *Vertical complexity*, in contrast, refers to a hierarchy of tasks in the sense that a higher-level task requires the coordination of two or more lower-level subtasks (for an application to physics see Stålne, Commons, and Li 2014; Appendix B: Table B.40). This also means that sequences of vertical complexity present hard structural stages or strong conceptions of Integrative Levels of Knowing. These highly abstract formalizations allow to compare task performances across multiple domains and even across species (Commons et al. 1989; Commons and Ross 2008a; 2008b). Commons reconstructs the following sequence of integrative levels of tasks (see Appendix B: Tables B.9):

0. Calculatory
1. Sensory and motor
2. Circular sensory-motor
3. Sensory-motor
4. Nominal
5. Sentential
6. Pre-operational
7. Primary
8. Concrete
9. Abstract
10. Formal
11. Systematic
12. Metasystematic
13. Paradigmatic
14. Cross-paradigmatic

4.2.2 Collective Development

The development of innovative forms of knowing does not take place in a social vacuum. There is a dialectic between individuals and society. Individuals are both products and producers of their social environment. As emphasized by Michiel Korthals (1997a), neither does individual development simply recapitulate collective development nor do social stages only reflect individual stages. Individual development and collective development present different processes following their own mechanisms. Korthals (1997a) argues that the distinction between logical and dynamical aspects of development helps to distinguish problems concerning the developing structures of reasoning from problems regarding the developing individual subject or collective group. Only with regard to the logic of collective development, it is possible to appeal heuristically to models that are originally designed for reconstructing the individual dimension (or the other way around). According to Korthals (1997a, 95), it remains possible and useful to identify developmental stages of collective development:

> The social context is in itself a result of individual and collective developments. As such it can be structured according to a stage pattern.

As in individual development, there are many different domains or lines of development in collective development that need to be analyzed separately. In this regard, Korthals (1997a) admits that collective development is much more complex compared to individual development since human societies can be highly stratified and segmented, and thus encompass a variety of different conceptual subsystems that coexist and may reflect different developmental stages. But this does not prevent theorists to orient their reconstruction of collective development on models of individual development. Historian Peter Dinzelbacher (2015) identifies three influential models on which approaches of collective development are primarily oriented. First, Sigmund Freud's model of psycho-sexual development that inspires,

among others, Norbert Elias's (1994) theory of the process of civilization and Lloyd deMause's (2000) theory of psychohistory. Second, Carl. G. Jung's model of psychological development that influences Erich Neumann's (1954) theory on mythological stages in the evolution of collective consciousness, besides the work of other developmentalists like Jean Gebser (1985), Willy Obrist (1988), and Franz Zwilgmeyer (1981). And third, Jean Piaget's model of cognitive development that is fruitfully applied, for example, by medievalist Charles Radding (1985), social anthropologist Christopher R. Hallpike (1979), and historian of English literature Don LePan (1989). As already mentioned, this list of Piagetian approaches to social evolution or collective development could easily be expanded (Harten 1977; Döbert 1981; Habermas 1984; Brunner-Traut 1992; Oesterdiekhoff 1992; Damerow 1996; Barnes 2000; Wilber 2000; Bammé 2011; Dux 2011).

Some of the most elaborate models of Integrative Levels of Knowing in collective development are derived from literature analysis and collected in Appendix C with detailed descriptions of their particular level characteristics. As in the previous section, these models can be considered to be promising means for knowledge organization (see Table 4.4).

Table 4.4 Domain-specific models of Integrative Levels of Knowing in collective development.

Domain of knowing	Reference	Appendix
Science and Religion	Barnes (2000)*	Table C.1
Religion	Bellah (1964)*	Table C.2
Numerical concepts and arithmetic thought	Damerow (1999)	Table C.3
Worldview	De Witt and Hedlund (2017)	Table C.4
Cognition and culture	Donald (2001)*	Table C.5
Understanding	Egan (1997)	Table C.6
Cultural consciousness	Fowler (1996)	Table C.7
Spatial representation in pictorial arts	Gablik (1979)*	Table C.8
Education	Gidley (2016)	Table C.9
Worldview	Habermas (1979)*	Table C.10
Collective identity	Habermas (1979)*	Table C.11
Moral and legal representations	Habermas (1979)*	Table C.12
Understanding of validity spheres	Habermas (1987)*	Table C.13
Organization	Laloux (2014)	Table C.14
Cognition in anthropoid primates	Parker and McKinney (1999)	Table C.15
Cognition and culture (modified after Merlin Donald)	Parker and McKinney (1999)*	Table C.16
Consciousness	Pisula (2016)	Table C.17
Cognition and culture (modified after Merlin Donald)	Renfrew (1998)*	Table C.18
Spatial thinking	Renn (2020)	Table C.19
Organizational action-logics	Torbert (2003)	Table C.20
Spatial cognition in stone-tool technology	Wynn (1985)	Table C.21

** Models that are exemplarily described in the main text.*

In the following, some examples of these domain-specific models of collective development will be introduced in more detail in order to determine their particular domains of knowledge and to name the reconstructed developmental sequence.

Habermas's Model of Worldview Development

One of the most elaborate and differentiated reconstructions of collective development oriented on findings regarding individual development is presented by Habermas (1979; 1984; 1987), as already described in detail in Chapter Three. It should be made clear that social evolution or historiogenesis does not simply present a recapitulation of ontogenesis. Nevertheless, the logic of development in certain domains of individual development can also be found in collective development. In this regard, Habermas formal-pragmatic distinction between objective, social, and subjective world relations is of utmost importance. On one hand, this distinction indicates that each one of these world relations is related to a domain-specific line of development (e.g., cognitive, moral, ego-identity) following its own logic of development. On the other hand, this distinction is by itself a product of development, namely, of the growing ability to differentiate world relations as different validity spheres. Therefore, Habermas's analysis of worldview development distinguishes between domain-specific reconstructions, such as moral or legal representations (see Appendix C: Table C.12) and collective identity (see Appendix C: Table C.11), and the reconstruction of the differentiation of world relations or validity spheres in general (see Appendix C: Tables C.10, C.13). In both cases, it is important to realize that societies are complex and often highly stratified and segmented, which means that not all of its members, social groups, institutions, or artifacts are equally representative for the dominant worldview structure or the corresponding level of knowing. This is particular the case for the distinction between sacred and profane domains of actions (see Appendix C: Table C.13). For example, archaic societies typically show a confusion of relations of validity and effectiveness in the sacred domain of rites and myths but a differentiation of both in the profane domain of day-to-day communication. Likewise, civilizations typically lack a clear distinction of specific validity claims (e.g., truth, rightness, truthfulness) in the sacred domain but distinguish them in the profane domain. Keeping these

differentiations in mind, Habermas reconstructs the following sequence of integrative levels of worldviews (see Appendix C: Table C.10):

1. Magical-animistic
2. Mythological-naive
3. Mythological-developed
4. Rationalized
5. Reflexive

Bellah's Model of Religious Development

Sociologist Robert N. Bellah (1964; 2011) investigates the development of religion that he defines, following Gliffort Geertz, as a system of symbols that establishes powerful and long-lasting motivations and moods involving an idea of a general order of existence. This notion of religion does not consider a belief in supernatural beings or gods to be an essential aspect. Religious reality is seen as both a realm of experience and a realm of representation. Bellah (2011) describes different modes of religious representation or symbolization as ideal types that are systematically related to conceptions of religious action and religious organization. With reference to Jean Piaget and Jerome S. Bruner, Bellah (2011) locates these modes of religious representation in stages of cognitive development of the child following an invariant order from unitive to enactive to symbolic to conceptual representation (see Appendix B: Table B.4). According to Bellah (2011), these ontogenetically described stages parallel descriptions of the development of human culture, as presented particularly by Merlin Donald's sequence from episodic to mimetic to mythic to theoretic cultures (see Appendix D: Table D.2). For Bellah (2011; 2012), religious evolution or development needs to be considered in relation to the more general processes of socio-cultural evolution. These should even be related to the macro-perspective of the so-called deep history that also includes biological and cosmological

evolution in order to recognize common developmental principles, such as an increasing differentiation and complexity of organization. Regarding religious development this includes, among other things, an increasing freedom of personality and society relative to the environing conditions (Bellah 1964, 374):

> Freedom has increased because at each successive stage the relation of man to the conditions of his existence has been conceived as more complex, more open and more subject to change and development.

Bellah reconstructs the following sequence of integrative levels of religion (see Appendix C: Table C.2):

1. Primitive (later: Tribal)
2. Archaic
3. Historic (later: Axial)
4. Early modern
5. Modern

Barnes's Model of Scientific and Religious Development

As a religious studies scholar, Michael H. Barnes (2000) investigates the long-term development of cognitive styles in culture with particular interest in parallel developments of scientific and religious thought in human history. He heavily draws on cognitive psychology and the traditions of cognitive-developmental theory and cognitive social-historical theory. In comparing a broad range of developmental approaches, Barnes comes to the conclusion that many of them are consistent with a Piagetian interpretation of history. These approaches include, among others, Robert N. Bellah's (1964) development of religious systems, Bernard Lonergan's (1992) development of theological method, Charles Radding's (1985) development of law and jurisprudence in medieval Europe, Ernst Gellner's (1990) development of cognition, Don

LePan's (1989) development of literary narratives, Merlin Donald's (1991) development of culture and cognition, Robert Kegan's (1994) application of his ontogenetic model of ego-identity development to history (e.g., traditionalism—modernism—postmodernism), Richard H. Schlagel's (1995) development of scientific thought in Greek antiquity, James W. Fowler's (1996) application of his ontogenetic model of faith development to history (e.g., pre-Enlightenment—Enlightenment—post-Enlightenment), and Kieran Egan's (1997) development of understanding. Barnes argues that collective developments in various domains of knowing, such as religion and science, show some parallels because they are derived from the same underlying thought styles. According to Barnes (2000, 45 [emphases in original]; see also Appendix D: Table D.1), Piaget's general description of cognitive development provides a fruitful descriptive framework, even though there may be justified criticisms of Piaget's theory:

> Piaget's description of stages helps to *categorize* thought styles more clearly. His theory also helps to recognize the particular *sequence* in which stages of thought appear in cultural history. In cultures as in individuals, the easier modes of thought appear first and continue to be used even when more difficult modes of thought are added.

Regarding the history of religion, Barnes criticizes the assumption that religious thought presents an earlier and less complex mode of thought compared to scientific thought, as put forward by older developmental theories like Auguste Comte's influential law of three stages. Instead, he argues that both scientific and religious thought develop along a pathway towards increasing complexity. Barnes reconstructs the following sequence of integrative levels of scientific and religious thought (see Appendix C: Table C.1):

1. Primitive
2. Archaic
3. Classical (axial)
4. Empirical-critical

Donald's Model of Cognitive-Cultural Development

Neuropsychologist and neuroanthropologist Merlin Donald (1991; 2001) studies the development of human cognition and culture. Since individual and collective development are considered to be highly interdependent, Donald (2001, 251) considers the interplay between cognition and culture in terms of "hybrid minds" that are partly formed by symbolically mediated culture, as well as in terms of "cognitive communities." Although the term *culture* usually refers to a shared set of habits, languages, or customs defining a population or group of people, Donald (2001, XIV) emphasizes the cognitive aspect of culture as the underlying "cognitive web" that defines and constrains the ways in which memories, knowledge, and thought are shaped in its members. In tracing back the evolutionary history of consciousness, Donald (2001, 11) distinguishes between levels of basic awareness that can also be found in many nonhuman species and levels of distinctively human consciousness that are shaped by the co-evolution of brain, culture, and cognition, also labeled as "deep enculturation." According to Donald, the multi-layered human consciousness is made possible by an expanded executive brain system, extreme cerebral plasticity, and a greatly expanded working memory capacity. But in opposition to pure neurological approaches, Donald (2001, 90) argues for a "new science of consciousness that maps out the phenomenology of inner cognitive spaces" and for comparative studies that offer a taxonomy or cladistic tree of conscious capacity. Donald's own model distinguishes three genuine human-specific levels of cognition and culture from an action-based *mimetic culture* to an oral-linguistic *mythic culture* to external-symbolic *theoretical culture*, largely corresponding to Piaget's stages of sensorimotor, preoperational, and operational cognition or to Bellah's stages of religious representation (see Appendix D: Table D.2; cp. also Appendix D: Table D.7). There are also some extensions of Donald's model introducing additional levels, such as Colin Renfrew's (1998) subdivision of the theoretical level into an *external-symbolic level* and a genuine *theoretical level* (see Appendix C: Table C.18), or

Sue T. Parker's and Michael L. McKinney's (1999) subdivision of the episodic level into a genuine *episodic level* and a level of *rudimentary symbolic capacities* (see Appendix C: Table C.16).

Although his model presents a clear hierarchy of nested layers or integrative levels of conscious capacity, Donald strongly underlines the fact that this sequence says nothing about value judgments since higher forms of consciousness cannot be *per se* considered to be better or more valuable compared to lower ones. Indeed, there are many cases in which mimetic or mythic knowledge representations can be even more adequate than theoretical ones, as it is often the case in the domains of art, politics, or interpersonal relationships (Donald 2006). Donald's original model reconstructs the following sequence of integrative levels of cognition and culture (see Appendix C: Table C.5):

1. Episodic
2. Mimetic
3. Mythic
4. Theoretic

Gablik's Model of Artistic Development

Art historian Suzi Gablik (1979) considers the history of art in the light of cognitive-developmental psychology in order to understand major changes of spatial representation in pictorial arts. She argues that there is a general developmental pattern of all knowledge branches based on fundamental transformations of thought processes in the evolution of human cognition, such as the evolution of logical or rational thinking from more image-based modes of thought. Accordingly, her approach to art history is not primarily interested in individual artistic styles or specific epochs but considers the history of art as a manifestation of more general transformative processes in human culture. Gablik's approach is mainly based on

Piaget's model of cognition in which perception and representation of the world become progressively more structured by thought processes. She treats artworks as representations of a particular form of world knowledge and analyzes them in terms of intellectual organization and underlying cognitive structures. Her investigation is focused on the different ways of spatial representation in pictorial arts and based on the assumption that cognitive-developmental stages can be considered to be levels of problem-solving competence. For example, she argues that the essential difference of Renaissance art compared to medieval art is the introduction of the third spatial dimension or perspective projection that requires the ability to solve the problem of rendering space, distance, volume, and mass. In general, she identifies a trend in spatial representation from topological relations with a lack of depth (e.g., ancient and medieval art) to projective relations that arrange spatial figures within a coordinate system (e.g., Renaissance art) to indeterminate spatial relations (e.g., modern art). But as noted by De Mul (1997a, 197), Gablik is fully aware that she is "reconstructing just one artistic dimension" and not the development of art as such. Even though she is interested in the question of progress in art, comparable to progress in science, Gablik's (1979, 24) "epistemological view of art history" stresses the fact that her study strictly excludes the question of aesthetic judgment since particular modes of spatial representation say nothing about the aesthetic values of artworks. Borrowing Jerome S. Bruner's terminology, Gablik reconstructs the following sequence of integrative levels of spatial representation in pictorial arts (see Appendix C: Table C.8):

1. Enactive
2. Iconic
3. Symbolic

It should be noted, however, that Gablik's (1979) use of terminology appears to be problematic because Bruner's (1974) understanding of the enactive, iconic, and symbolic modes of

representation differs markedly from Gablik's reconstruction of three modes of spatial representation. According to Bruner, *enactive representation* refers to action patterns (e.g., tying a knot), *iconic representation* refers to images (e.g., a picture of a knot), and *symbolic representation* refers to a symbol system like language (e.g., a verbal description of a knot) (see Appendix B: Table B.8). This means that Gablik's three modes of spatial representation should be related to Bruner's iconic mode since all of them are image-based representations of space. Gablik seems to confuse what Piaget (1999) calls *sensorimotor schemata* (Bruner's enactive representation) and their integration into *imaginal schemata* (Bruner's iconic representation), which in turn can be integrated into *concrete schemata* or *formal schemata* (Bruner's symbolic representation) (see Appendix B: Table B.36). For a similar reason, Gablik's interpretation of the perspective projection in Renaissance art as being related to Piaget's concrete-operational cognition, instead of formal-operational cognition (cp. Wilber 2000), does not appear very convincing in her otherwise insightful structural analysis.

4.3 Document Indexing based on Integrative Levels of Knowing

In this section, it will be sketched out how the organizing principle of Integrative Levels of Knowing has already been applied by several theorists for the analysis of authorial perspectives of text documents (cp. Kleineberg 2018; 2020). The following examples are restricted to the domain of moral consciousness and taken from historical and cross-cultural studies on ethics and morals (Radding 1978; Schluchter 1981; Apel 1988; Rosenberg, Ward, and Chilton 1988; Roetz 1993; Hallpike 2017). All these theorists apply explicitly or implicitly Habermas's (1990, 28) methodology of "hermeneutic reconstructionism" by taking recourse to an already existing domain-specific ILK model, namely, to Kohlberg's model of moral development or "rational reconstruction of the ontogenesis of justice reasoning" (Kohlberg, Levine, and Hewer 1983, 10).

As described in Chapter Three, Habermas (1979) distinguishes two modes of meaning explication. The first mode is related to the surface structure in terms of the *semantic content* of a symbolic expression or the author's explicit know-that. In document indexing, this traditional form of interpretation is concerned with subject analysis and the aboutness of a document. The second mode refers to the deep structure in terms of the *generative structures* according to which a symbolic expression is brought forth or the author's implicit know-how. In document indexing, this depth-hermeneutic form of interpretation is concerned with context analysis and the authorial perspective of the document.

In this case, the generative structures can be interpreted in the light of Kohlberg's model of moral development. According to Habermas's (1990) formal-pragmatic perspective, moral consciousness dealing with norms and values refers to regulative speech acts in relation to the social world claiming validity in terms of rightness. In this respect, moral consciousness is a universal and cross-cultural phenomenon. From a developmental-logical perspective, however, there can be found stage-like qualitative differences in the justification of what can be considered to be morally just and reasonable (see Table 4.5).

Table 4.5 Kohlberg's model of moral development

Level	Characteristics
Level A *Preconventional*	*Action and judgment are directed by a naive hedonism and not by internalized expectations of others, group solidarity, or general ideas of justice. Sanction: punishment (deprivation of physical rewards).*
Stage 1 Punishment and obedience orientation	The physical consequences decide whether an action is right or wrong. Obedience to authority is guided by the egocentric interest in benefits and the avoidance of physical harm. Egocentric perspective: complementarity of order and obedience.
Stage 2 Instrumental exchange	What is right, is, like at Stage 1, that which satisfies one's own immediate needs while strategically also recognizing the interests of others. The orientation is towards elementary rules of reciprocity and concrete exchange like "you scratch my back and I'll scratch yours." Egocentric perspective: symmetry of compensation.
Level B *Conventional*	*Action and judgment are directed in an alienated way (especially at Stage 4) by means of self-identification with heteronomous rules and norms. The aim is not only adjustment to a given order, but its maintenance for its own sake. Sanction: shame (withdrawal of love and social recognition).*
Stage 3 "Good boy—nice girl" orientation	The right is what "pleases" and what is motivated by the rules, values, and expectations of groups. Primary group perspective: conformity to roles.
Stage 4 Law and order orientation	The right is what is in accordance with the prescriptions of one's role in state and society. Action and judgment are motivated by the respect for authority and doing one's duty as a value per se. Perspective of a collectivity (the system's point of view): conformity to the existing system of norms.
Level C *Postconventional*	*Conventional morality is not necessarily rejected (except at Stage 4½), but its acceptance is accompanied by a clear awareness of the possible conflict between conventions and law on the one hand and morality on the other. Sanction: guilt (reaction of conscience).*
Stage 4½ "Anything goes" and youthful protest	What is right is a question of arbitrary subjective decisions. This stage is characterized by a radical rejection of the alienated conventionalism of Level B and the recourse to the naive pleasure principle of Level A. Instead of new normative rules, this stage proclaims a provocative "beyond good and evil." It is postconventional but not yet principled.
Stage 5 Utilitarian, relativistic social contract orientation	What is right is not predetermined, like on Level B, by the existing institutions and social conditions. It is first of all a matter of personal, relative values and opinions. Beyond this it is defined in terms of standards that have been agreed upon by free and equal individuals and that can be changed by regulated procedures. Principled perspective (prior to society): orientation toward principles of justice.
Stage 6 Universal ethical principle orientation	The right is what is in accordance with abstract, consistent, and universally valid principles. It is based on the autonomous decision of conscience. Procedural perspective (ideal role taking): orientation toward procedures for justifying norms.

Source: Kleineberg (2018, 403–4: Table 1) based on Roetz (1993) and Habermas (1979; 1990).

Even though there is a variety of perspectives on justice or morality, the structural development of moral consciousness appears to follow an invariant sequence of stages across cultures and sex differences (Kohlberg, Levine, and Hewer 1983; Jorgensen 2006; Gibbs et al.

2007). This allows to establish a non-relativistic and comparative framework for a systematic organization of different moral views, as highlighted by Habermas (1990, 117 [emphases in original]):

> Opponents of universalistic ethics generally bring up the fact that different cultures have *different* conceptions of morality. To oppose relativistic objections of this kind, Kohlberg's theory of moral development offers the possibility of (a) reducing the empirical diversity of existing moral views to variation in the *contents*, in contrast to the universal *forms*, of moral judgment and (b) explaining the remaining structural differences between moralities as differences in the stage of development of the capacity for moral judgment.

As already discussed, one might expect some "homologous structures of consciousness in the histories of the individual and the species" (Habermas 1979, 99; see also Wilber 1999; Barnes 2000; Bammé 2011; Bellah 2011; Dinzelbacher 2015). This means that viewpoint analyses based on Kohlberg's moral stages are not restricted to individual authors of a document but can also be applied to collectively shared interpretive systems like religious or philosophical ethics (Apel 1988; Roetz 1993; Hallpike 2017) and institutionalized legal or moral representations (Radding 1978; Schluchter 1981; Rosenberg, Ward, and Chilton 1988; Oesterdiekhoff 2014a). Generally, a document presents at the same time a manifestation of individual cognitive structures and collectively shared forms of knowing. Thus, it is possible to analyze the authorial perspective of a documents in terms of both individual and collective development. However, the analytical distinction between individual and collective development remains of utmost importance for the rational reconstruction of competences and for modeling Integrative Levels of Knowing.

The analysis and indexing of authorial perspectives according to Kohlberg's stage descriptions of moral development requires a depth-hermeneutical interpretation of significant features of the document. But, again, this does not mean to judge an individual author as a

person or a given culture as a whole since hermeneutic reconstructionism is restricted to an understanding of particular validity claims raised in communicative actions, for example, by means of written documents (Backlund 2005; Budd 2011). The following examples in Table 4.6 are intended to illustrate the basic idea of viewpoint analysis and indexing.

Table 4.6 Examples of viewpoint analysis and indexing using Kohlberg's model of moral development.

Document	Significant features	Level	Reference
Shujing (*Book of Documents*), chapter *Pan Geng*, c. 1100 BCE	Orientation towards role and upholding of the system instead of preference for kin. Establishment of a political state order.	Stage 4	Roetz (1993, 35)
Iliad, attributed to Homer, 8th century BCE	Thoughts being placed in the mind by gods. Lack of rights for individuals. Heroism and despotism based on power.	Stage 2	Barnes (2000, 107–8)
Recorded sayings of Buddha, Confucius, the Jewish prophets, and Muhammad, 6th century BCE to 7th century CE	Reflection on society as a whole, on individuals independently of social status. Distinction between moral principles and duties or customs. Importance of conscience. Significance of intention.	Stage 5	Hallpike (2017, 301)
Zhuangzi, 4th to 2nd centuries BCE	Rejection of conventional compulsion. Youthful protest. Glorification of freedom of the child. Defense of opportunism.	Stage 4½	Roetz (1993, 257)
Xunzi, 3rd century BCE	The state as product of reasonable deliberation. Utilitarian rationale. Critique of conventional role-morality: "Follow the Dao and not the ruler, follow justice and not the father."	Stage 5	Roetz (1993, 63–65, 269, 274)
Leges Henrici Primi (*Laws of Henry I*), 1114-1118	Interchangeability of intention and behavior. Lack of abstract principles. Justice as exchange.	Stage 2	Radding (1978, 578–79, 586)
Song of the Nibelungs, early 13th century	Morality of loyalty. Conventions of tribal society.	Stage 3	Apel (1988, 473)
The Social Contract by Jean-Jacques Rousseau, 1762	Critique of feudal system. Inalienable rights of liberty. Principles of democracy based on natural law and social contract.	Stage 5	Bammé (2011, 566)
United States Declaration of Independence, 1776	Inalienable rights based on equality and mutual respect. Adjudicating public law derived from rational debate and consent.	Stage 5	Rosenberg, Ward & Chilton (1988, 152)
Critique of Practical Reason by Immanuel Kant, 1788	Ethic of responsibility in monological, not yet dialogical form. Validity based on reflexive principles. Evaluation of consequences of conduct.	Stage 5	Schluchter (1981, 63–64)
Beyond Good and Evil by Friedrich Nietzsche, 1886	Denunciation of validity claims of morality. Genealogy as naturalistic reductionism.	Stage 4½	Apel (1988, 388)
A Theory of Justice by John Rawls, 1971	Moral principles designed to reach agreement in situations of potential moral conflict. Justice as reversibility.	Stage 6	Kohlberg, Levine & Hewer (1983, 61–62)

Source: Kleineberg (2018, 405–6: Table 2).

Document indexing based on the organizing principle of Integrative Levels of Knowing is exemplified in this section by Kohlberg's moral stages but can easily be extended to other domains of human cognition by means of other ILK models (see Appendix E: Table E.1). The main contribution of Habermas's hermeneutic reconstructionism to indexing theory is that it allows analyzing mutually contradicting perspectives or forms of knowing in a systematic and non-relativistic way (Cooke 1994; Bookman 2002; Backlund 2005; Pedersen 2008). In contrast to a strong contextualism resulting in a relativistic "hermeneutic nihilism" (Campbell 1988, 505), such a depth-hermeneutical analysis considers different points of view not simply as equally valid but to be amenable to an evaluation of reasons according to normative standards of rationality.

4.4 Summary

This chapter outlines the proposed cognitive-developmental approach to knowledge organization in that it introduces conceptions and models of Integrative Levels of Knowing as helpful tools for a systematic organization of epistemic contexts. More clearly than the cognitive view to knowledge organization, this approach acknowledges the dialectic between individual and collective development and the rich contextual settings in which human cognition is embedded. Similar to cognitive-historical approaches, it is concerned with the structural change of forms of knowing but the focus is less on the context-specific dynamics of development but more on the context-independent logic of development. In this regard, the cognitive-developmental approach is unique in presenting an organizing principle that can be applied across various cognitive, cultural, and historical contexts.

This organizing principle in the form of strong or weak versions of Integrative Levels of Knowing is the common feature of different research traditions on human development that are summarized in this study as the cognitive-developmental approach. These research

traditions include the *cognitive-developmental theory* in the narrower sense, the *psychosocial theory*, the *cognitive social-historical theory*, and the *dynamic systems theory*. All of them provide a broad range of domain-specific models of Integrative Levels of Knowing that are collected in the Appendices B–C with detailed descriptions of the characteristics of particular levels of knowing. Some of the most elaborate models for individual and collective development are exemplarily introduced, while one them serves as an example for the application of ILK models for viewpoint analysis in document indexing. Using Kohlberg's model of moral development, it is shown how the organizing principle of Integrative Levels of Knowing is already applied by several theorists who use the methodology of hermeneutic reconstructionism in order to analyze and index the authorial perspectives of text documents.

In the following two chapters, the cognitive-developmental approach to knowledge organization will be applied in two case studies. The first one will be concerned with the analytical dimension of *knowledge organization in context* or the information professionals's frames of reference (context of mediation), whereas the second one will be concerned with the analytical dimension of *context in knowledge organization* or the authorial perspectives (context of production).

5 CASE STUDY I: THE ANCIENT CHINESE LIBRARY CLASSIFICATION *SEVEN EPITOMES*

5.1 The *Seven Epitomes* in Context

5.1.1 The Socio-Epistemological Approach

This case study is concerned with a specific knowledge organization system under consideration of its epistemic context. The overarching goal is to demonstrate exemplarily the contribution of the proposed cognitive-developmental approach to knowledge organization, that is, a methodological extension to domain analysis, complementary to the prevailing socio-epistemological approach. While the socio-epistemological approach mainly focuses on unique characteristics of a given epistemic context, the cognitive-developmental approach takes also structural similarities and differences across contexts into account. This comparative interest requires additional methodological tools to analyze the underlying rule system or generative structures according to which a cultural artifact like a knowledge organization system is brought forth. It will be shown that a formal-pragmatic analysis based on rational reconstructions of those cognitive competences that are involved in the construction of knowledge organization systems can offer such methodological tools. These rational reconstructions already exist in the form of models of Integrative Levels of Knowing and are characterized by a logic of development that is independent of particular contexts. Thus, the decisive advantage of the cognitive-developmental approach is to offer a point of departure for cross-cultural and historical comparisons and a clearer distinction between culture-specific and transcultural features of knowledge organization systems.

The object under investigation is the ancient Chinese library classification known as the *Seven Epitomes*. One reason for this choice is that the classificatory structure of the *Seven Epitomes* presents a significant contrast to those of today's dominant library classifications (e.g., DDC, UDC, LCC) due to its original formative context that presents both a cultural distance and a

historical distance. Another reason is that the *Seven Epitomes*, as an object of study in the field of knowledge organization, is well documented in a research project under the lead of Hur-Li Lee in which the epistemic foundation is the explicit focus of the investigation (Lee 2008; 2010a; 2010b; 2012a; 2012b; 2016; Lee and Lan 2009; 2011). As an initial orientation, this section describes the *Seven Epitomes* according to Lee's (2016, 3) "socio-epistemological approach." The next section discusses some limitations of this methodology and the potential contribution of the cognitive-developmental approach. Finally, the remainder of this case study applies the cognitive-developmental approach to knowledge organization, taking a comparison of the *Seven Epitomes* with the *Dewey Decimal Classification* as an example.

The *Seven Epitomes* presents the first classified library catalog in China and has a strong influence on the history of Chinese classification and bibliography until the early 20th century (Tsien 1952; Liu-Lengyel 1987; Jiang 2007; Lee 2016). Its origin dates back to a book collation project during the Former Han dynasty (206 BCE–8 CE), initiated by Emperor Wu (reign 141–87 BCE) and put into effect per special decree in 26 BCE by Emperor Cheng (reign 33–7 BCE). After 20 years of scholarly work guided by Liu Xiang (77–6 BCE) and later by his son Liu Xin (53? BCE–23 CE), the *Seven Epitomes* is completed as the catalog of the imperial library around 7 or 6 BCE.

Unfortunately, the *Seven Epitomes* is only extant in fragments. As reported by Lee and Lan (2009), the outcome of the book collation project are two bibliographical tools. First, the *Separate Résumés* (*Bie lu*) containing detailed abstracts of each finally edited book as a report to the Emperor. Today, only eight of these résumés are still extant. And second, the *Seven Epitomes* (*Qi lue*)—sometimes translated as *Seven Abstracts* or *Seven Summaries* since the character *lue* means something that forms a "condensed record or representation 'in miniature'" (Lee 2016, 79)—containing abbreviated texts from the *Separate Résumés* and an additional classification scheme for organizing the entries in the library catalog. The complete texts of both works disappear between the late ninth century and the early tenth century and are still lost today.

Only during the Qing dynasty (1644–1911) some scholars make the attempt to reconstruct the *Seven Epitomes* by collecting the surviving fragments of the original text quoted in various ancient writings. The main source of these reconstructions is a chapter from the *History of the Former Han Dynasty* (*Han shu*) by Ban Gu (32–92) known as the *Han Bibliographic Treatise* or simply the *Han Treatise*, written about a hundred years after the completion of the *Seven Epitomes*. As summarized by Lee (2016), the accepted view today is that the *Han Treatise* presents an abridged edition of the *Seven Epitomes* in which a few entries are added, relocated, or removed, while the majority of entries and the classification scheme are still congruent to the original. According to Lee and Lan (2009), the version reconstructed by Yao Zhenzong (1843–1906) at the end of the 19th century can be regarded as the most valuable basis for studying the *Seven Epitomes*.

In order to locate the formative context of the *Seven Epitomes*, two historical timelines are presented. The first one gives an overview of Chinese dynasties from ancient times to the early 20th century (Table 5.1), while the second one shows some milestones in the history of Chinese literature until the completion of the *Seven Epitomes* at the end of the Former Han dynasty (Table 5.2).

Table 5.1 Periodization of Chinese dynasties.

Dynasty	Time (according to LCC)	Time (according to Chinese historians)
Xia	ca. 2205–1766 BCE	21st–16th centuries BCE
Shang	1766–1122 BCE	16th–11th centuries BCE
Western Zhou	1122–771 BCE	11th century–249 BCE
Eastern Zhou	771–256 BCE	
Spring and Autumn	722–481 BCE	770–475 BCE
Warring States	403–221 BCE	453–221 BCE
Qin	221–207 BCE	221–206 BCE
Western (Former) Han	202 BCE–9 CE	206 BCE–8 CE
Xin	9–23	8–23
Eastern (Later) Han	25–220	25–220
Three Kingdoms	220–265	220–280
Jin	265–419	265–420
Northern and Southern Dynasties	386–589	386–588
Sui	581–618	581–618
Tang	618–907	618–907
Five Dynasties and the Ten Kingdoms	907–979	907–979
Northern Song	960–1127	960–1127
Southern Song	1127–1279	1127–1279
Yuan	1260–1368	1271–1368
Ming	1368–1643	1368–1644
Qing	1644–1912	1644–1911

Source: Based on Lee (2016, III).

Table 5.2 Literary timeline from antiquity to the completion of the *Seven Epitomes*.

Period	Literary history
Spring and Autumn era (770–475 BCE)	Confucius (551–479 BCE) was the person credited as the first to spread literacy in private teaching and outside families. Prior to that, writing was the exclusive privilege of the very few in government and often taught by father to son.
Warring States era (453–221 BCE)	Most of the "hundred schools of thought" (e.g., Classicists, Daoists, Mohists) emerged and thrived.
	Simple categorizations of masters appeared in literature (e.g., *Zhuangzi*, *Xunzi*).
Qin dynasty (221–206)	First Emperor of the Qin (reign 221–210 BCE) instituted policy to place formal learning under the exclusive control of the central government, ban private ownership of texts, and have certain writings burned in 213 BCE.
	In 206 BCE, the rebels set fire to the palace compound, which lasted for three months, burning down all buildings and destroying the majority of government records and all its book collections.
Former Han dynasty (206 BCE–8 CE)	In 191 BCE, the policy on book banning was officially lifted.
	Emperor Wu (reign 141–87 BCE) implemented plans to systematically collect books and set up new offices for hand-copying texts.
	In 136 BCE, Emperor Wu changed the positions of court Academicians and designated them only for selected scholars specializing in one of the Five Classics.
	In 124 BCE, Emperor Wu founded the Imperial Academy. Pupils at the Academy, studying exclusively the Classics under Academicians, took an examination at the completion of their study that would determine their entrance into the officialdom. This second policy is regarded in history as the one establishing the examination system for civil service throughout imperial China. Together, this policy and the previous one instituted *Ru* Classicism (mostly referred to as Confucianism in the West) as the imperial orthodoxy.
	During Emperor Cheng's reign (33–7 BCE), two significant events involving books took place: an official messenger, Chen Nong, was sent all over the empire to find lost works, and, in 26 BCE, a special decree started a monumental collation project to salvage the books already collected at the depositories of the inner court.
	Approximately in 7 or 6 BCE, Liu Xin (53? BCE–23 CE) completed the *Seven Epitomes*—the classified catalog for the imperial library that held all books from the above collation project.

Source: Based on Lee (2016, 5: Table 1.1).

According to Lee (2016), the *Seven Epitomes* can be considered to be both a bibliography and a library catalog. The Chinese term *mulu* refers to different meanings like table of contents, bibliography, or library catalog without clear distinctions (Lee 2016). Indeed, library catalogs in imperial China often circulate outside libraries and function as bibliographies.

As a bibliography, the *Seven Epitomes* presents a listing of books in terms of title, name of the author (or attributed author if known at all), and a short annotation containing information, for example, about variant titles, the author's courtesy name, the theme and origin of the work, or even a brief evaluation (e.g., "it is superficial"). From a bibliographical perspective, the concept of *book* refers to the intellectual work or content rather than the physical document.

As a library catalog, the *Seven Epitomes* also provides information about the physical documents as an inventory of the imperial library and offers a classification scheme as a tool for information retrieval. In ancient China, written documents are commonly available in the form of wooden and bamboo slips bound to a literary unit, much less frequently in the form of the more expensive silk cloth. Due to the bulkiness and weight of these materials, the possibility to compile long texts in a single unit is limited. Therefore, shorter units are often combined into chapters or volumes which in turn can be further combined into more extensive books. The *Seven Epitomes* counts more than 13,000 chapters or volumes of the imperial library, listed separately for each Division of the catalog. The classification scheme consists of six Epitomes or main classes preceded by the so-called Collective Epitome containing introductions to the other Epitomes, resulting in the number of seven from which the name of the classification is derived. The six main classes are divided into thirty-eight Divisions or subclasses in total (see Table 5.3).

Table 5.3 Classification scheme of the *Seven Epitomes* with estimated chapter/volume count.

Epitome (main class)	Division (subclass)	Chapter/volume count: *Han Treatise*	*Seven Epitomes* (reconstructed)
Collective Epitome (*ji lue*)	*A collection of the prefatory and sectional introductions*		
Six Arts (*liuyi lue*)	Changes	294	294
	Documents	422	421
	Odes	415	415
	Rites	607	452
	Music	165	172
	Spring and Autumn Annals	901	905
	Analects	230	230
	Book of Filial Piety	56	56
	Philology	45	42
	9 Divisions total:	3,135	2,987
Masters (*zhuzi lue*)	*Ru* Classicists (Confucians)	847	809
	Daoists	1,038	1,038
	Theorists of Yin-Yang (Naturalists)	368	368
	Legalists	217	217
	Logicians (Sophists)	36	36
	Mohists	86	86
	Diplomatists (Strategists)	107	107
	Eclectics (Syncretists or Generalists)	393	418
	Agronomists	114	114
	Novelists	1,390	1,390
	10 Divisions total:	4,596	4,583
Lyrics and Rhapsodies (*shifu lue*)	Rhapsodies 1	361	361
	Rhapsodies 2	275	267
	Rhapsodies 3	136	136
	Diverse Rhapsodies	233	233
	Lyrics	316	316
	5 Divisions total:	1,321	1,313
Military Texts (*bingshu lue*)	Military Tactics	270	684
	Military Terrain	102	102
	Military Yin-Yang	227	227
	Military Skills	207	194
	4 Divisions total:	806	1,207
Divination and Numbers (*shushu lue*)	Patterns of Heaven	419	419
	Chronology	566	566
	Five Phases	654	654
	Milfoil and Turtle Shell	485	485
	Diverse Prognostications	312	312
	System of Forms	122	122
	6 Divisions total:	2,558	2,558

(continued)

Table 5.3 Classification scheme of the *Seven Epitomes* with estimated chapter/volume count.

Epitome (main class)	Division (subclass)		Chapter/volume count: *Han Treatise*	*Seven Epitomes* (reconstructed)
Formulae and Techniques (*fangji lue*)	Medical Classics		175	175
	Pharmacology		295	295
	Sexology		191	191
	Longevity		201	201
		4 Divisions total:	862	862
		Total:	13,278*	13,510

Source: Based on Lee (2016, 67: Table 2.2, 79).

*In Lee (2016), the sum of the chapter/volume count in the *Han Treatise* is incorrectly added to 13,728, due obviously to transposed digits, while Lee and Lan (2011, 29: Table 1) present slightly different counts which also appear to be incorrectly added to a sum of 13,269 instead of 13,065 chapters or volumes.

As knowledge organization system, the *Seven Epitomes* organizes books since *knowledge* is not a normalized concept in ancient China, nevertheless, "its classification is based entirely on the aggregate content of the library collection, not the physical features of the books" (Lee 2016, 133–34). It should be noted, however, that the coverage of this classification has a limited scope since it is neither intended to present a comprehensive record of all writings available at the time nor to construct a universal scheme. For example, certain kinds of writings (e.g., law, elementary math) are excluded from consideration, and a main class like History that is common in later Chinese library catalogs is missing.

According to Lee and Lan (2009), the *Seven Epitomes* is the result of a conscious and deliberate endeavor rather than a thoughtless act. Lee (2016, 30) emphasizes that for a deeper understanding of the underlying intentions of its creators, it is important to consider this ancient Chinese library classification in its particular "sociocultural context," that is, in relation to its function for the library of the Imperial Academy during the Former Han dynasty and to the prevailing cultural identity, ideological orthodoxy, and political agenda at the time.

In her attempt to reconstruct the epistemological and ideological foundations of the *Seven Epitomes*, Lee (2016, 134–42 [excerpted]; order of principles taken from Lee 2012a, 396) takes a broad range of historical sources into account and identifies five main principles:

1. Imperial library collection as the literary warrant;
2. Government functions considered for structuring texts;
3. Classicism determining the main classificatory structure;
4. Knowledge perceived and organized as a unity;
5. Correlative thinking connecting all text categories to a supreme knowledge.

The first principle, *imperial library collection as the literary warrant*, states that the *Seven Epitomes* is oriented on the body of existing writings of the imperial library collection. This becomes evident by the fact that the classification scheme is not universal in scope but excludes text categories that are outside of the collection parameters and does not reserve space for potential categories that might be relevant in the future. Examples indicating the literary warrant are the inclusion of philology and the exclusion of elementary math as text categories. This means that the classificatory structure does not present a comprehensive picture of the intellectual landscape of the Han dynasty. A further indication of literary warrant, not explicitly mentioned by Hur-Li Lee, is a correlation of increasing Divisions of Epitomes with the increasing count of chapters or volumes within a given Epitome. For example, the highest chapter/volume count is found in the Epitome of the Masters which contains with ten Divisions the highest number of subclasses, whereas the Epitomes with the lowest chapter/volume counts, namely, the Epitome of Military Texts and the Epitome of Formulae and Techniques are divided into not more than four subclasses (see Table 5.3).

The second principle, *government functions considered for structuring texts*, means that the *Seven Epitomes* as a result of the book collation project and part of the library of the Imperial Academy serves the Emperor in his governing. As such it is part of a grand strategy for empire building, in particular, as a means for the education of the cultural elite that holds the offices of

the inner court. According to Lee (2012a, 395), this principle is even more important than the aboutness principle:

> Government functions rather than topical similarities serve as dictates there for textual categories. This explains why texts on the same topics are sometimes classified in different epitomes.

For example, books on Yin Yang theory are entered under both the Epitome of Military Texts and the Epitome of Divination and Numbers because they are used in different official functions. Such government functions also imply that the *Seven Epitomes* reflects the prevailing orthodox ideology of the Former Han dynasty which is known as Classicism.

The third principle, *Classicism determining the main classificatory structure*, states that the *Seven Epitomes* is not merely a tool for information retrieval but also a cultural artifact with an intended authoritative function to provide intellectual guidance for its users oriented on the value system of Classicism. Lee (2016, 36) refers to such a purposeful promotion of a particular way of thinking or selected worldview as "intellectual activism," showing what she calls a deliberate bias. Classicism or *Ru* Classicism (*Ruxuek* or *Rujia*) is often labeled as *Confucianism*, which is criticized by Lee (2016) for being reductionist and inappropriate since its connotations are limited to the followers of Confucius. Classicism in the Former Han dynasty is established by the policy of Emperor Wu to compile a canonization of the Classics that build the exclusive object of study for pupils of the Imperial Academy. In the following, it will be described in more detail how, according to Lee (2016), the ideology of Classicism determines the main structure of the *Seven Epitomes*.

The canonization of the Classics includes six groups of texts considered to be passed down from ancient sage kings, known as the Six Classics. At the same time, these groups of texts present the six branches of learning or the Six Arts referring directly to the supreme wisdom of the Way (*dao*), a key concept of traditional Chinese philosophy denoting the proper path in life

followed by the sages (cp. Lloyd and Sivin 2002). The Epitome of the Six Arts contains the text groups of Odes, Documents, Rites, Music, Changes, as well as Spring and Autumn Annals. Since the texts compiled under Music are largely lost in Han times, the corpus is sometimes also referred to as the Five Classics. The Classics build the first Divisions of the first Epitome, the Six Arts, in which the Division of Changes is placed on top, reflecting the value system of the Han times (Lee 2016). Additionally, the *Seven Epitomes* places the works attributed to Confucius, the *Analects* and the *Book of Filial Piety*, also in the Epitome of the Six Arts instead of the Epitome of the Masters in which these should be expected. This is because the master Confucius is valued to be the most important representative of Classicism in Han times. Likewise, the Division of Philology completes the Epitome of the Six Arts since these texts are directly concerned with the writings of the Classics.

In comparison to the Classics representing the wisdom of the Way, the texts grouped into the second Epitome, the Masters, are considered to be corrupted to some extent, presenting only a second-rate and fragmented knowledge of the Way. Following the value system of Classicism, the most important writings are considered to be those grouped into the top Division of Classicists, followed by other schools of thought ranked according to their decreasing value. In contrast to the intellectual diversity in the Warring States era, the Former Han government seeks to control the intellectual discourse by dictating a "state-sanctioned ideology" (Lee 2008, 280). Besides the dominating doctrine of Classicism, which absorbs many elements from other traditions resulting in mixed forms like "Yin Yang Confucianism" (Lee 2016, 130), the Han government also sustained further ideologies, particularly, Daoism and Legalism. As noted by Lee (2016), the Divisions of the Epitome of the Masters do not present mutually exclusive classes and entries appear to be arbitrary to some extent.

The third Epitome, Lyrics and Rhapsodies, includes writings of poets mainly concerned with morality and connected to the teachings of the Way. From a Classicist perspective, however,

"poetry is not evaluated as belle-lettres" (Lee 2016, 91) and, therefore, ranked lower than the Six Arts and the Masters. The last three Epitomes of Military Texts, Divination and Numbers, as well as Formulae and Techniques are concerned with more technical and pragmatic-functional aspects (e.g., military, astrological/astronomical, and health issues) that cannot be traced back to the ancient sage kings, which is why they are even less valued and ranked the lowest in the scheme.

In her analysis of how Classicism determines the main classificatory structure of the *Seven Epitomes*, Lee (2012b) identifies two principal methods, namely, hierarchization and dichotomy. The method of hierarchization refers to the principle of subordination in the arrangement of text categories and document entries both vertically and horizontally, to follow Lee's deliberate anachronistic use of modern terminology.

A *vertical hierarchy* expresses the relation between an Epitome (main class) and its subordinated Division (subclass), for example, between the Epitome of the Masters and the Division of the Classicists. As emphasized by Lee (2012a, 392), such vertical hierarchies may resemble genus-species relations known from taxonomies based on logic but there is no evidence that "Liu Xin or his father applied deductive methods to divide the six broad categories into subcategories." It seems to be more likely that the kind of vertical hierarchies of the *Seven Epitomes* presents a "subjective structure, imposed by a Classicist, that emphasizes unique moral strength rather than mutual exclusivity of individual categories" (Lee 2012a, 393).

By comparison, a *horizontal hierarchy* expresses the subordination between main classes or between subclasses within the same class or between entries under the same category. In the *Seven Epitomes*, horizontal hierarchies reflect either the "Classicist moral ladder" (Lee 2016, 136), as described above, or the "Classicist temporal principle" (Lee 2016, 182) that relates document entries in chronological order indicating the intellectual genealogy and the age-related value of the writings. It should be noted, however, that the metaphor of a ladder

illustrates a vertical instead a horizontal relation, showing thus the inadequacy of the modern term *horizontal hierarchy*. The crucial point is that these subordinate relations present value rankings from the most to the least important classes or text categories, independent of their representation in a horizontal form (see Lee 2016, 173: Figure 5.8) or a vertical form (see Lee 2016, 159: Figure 5.1). Value rankings, in turn, should not be confused with hierarchies based on logical principles like genus-species or part-whole relations. In her analyses, the Classicist value rankings prioritize the theoretical over the practical, the broad over the narrow, and the general over the particular, and Lee (2016, 139) concludes that "moral hierarchies in Classicist thought morph into the structural hierarchies in the classification."

The fact that the method of hierarchization presents one of the "signature characteristics of Classicism" (Lee 2016, 170) is also reflected by dichotomy as the second principal method. Dichotomy means a division into a binary opposition or dualism like origin/end, ruler/minister, father/son, or husband/wife. In these traditional Chinese dichotomies, the former part of each pair is considered to be superior to the latter part. As emphasized by Lee (2012b), however, Chinese dichotomies do not present strict logical binary oppositions because they require no assumption of mutual exclusivity. Regarding the six main classes of the *Seven Epitomes*, Lee reconstructs five underlying dichotomies that help to explain the resulting ranked order of the Epitomes (see Figure 5.1).

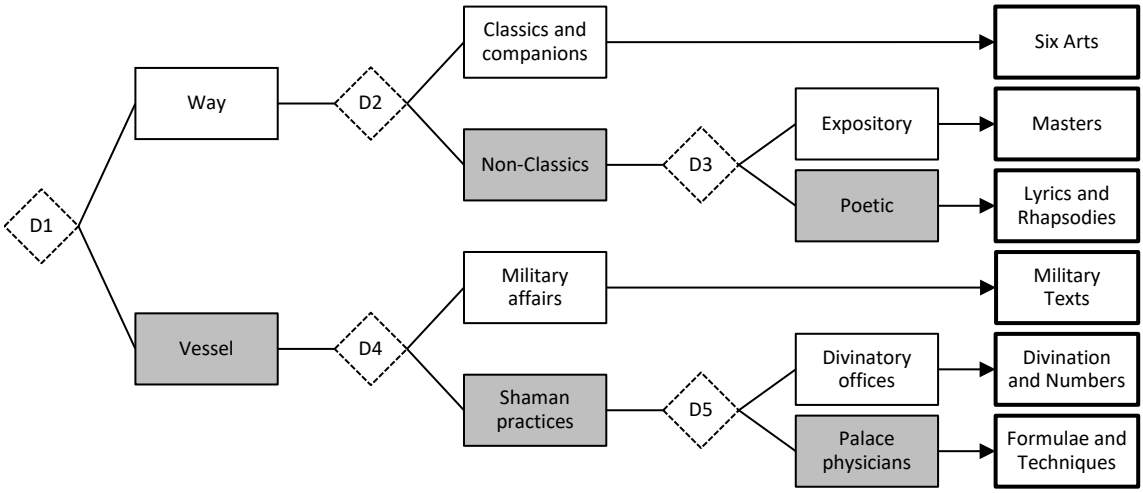

Figure 5.1 The *Seven Epitome*'s six main classes in ranked order derived from value dichotomies (based on Lee 2016, 159: Figure 5.1).

In Figure 5.1, five value dichotomies are depicted in which the shadowed parts indicate the inferior and less valued categories. First, the ideological/labor dichotomy (D1) distinguishes between philosophical texts and technical writings, known as the "Classicist Way/vessel dichotomy" (Lee 2016, 68). Second, the classic/non-classic dichotomy (D2) distinguishes between the more important canonized works of the Classics and those of their followers like masters, disciples, and poets. Third, the expository/poetic dichotomy (D3) distinguishes between prose writings and works of poetry, the latter with less political functions. Fourth, the military/non-military dichotomy (D4) distinguishes between technical writings relevant to imperial warfare and other less important technical writings concerned with shamanic practices. And fifth, the divinatory/medical dichotomy (D5) distinguishes between texts concerned with natural or heavenly phenomena (e.g., astrology/astronomy, chronology, divination) and less valued writings dealing with the human body (e.g., medicine, hygienic practices). As outlined in detail by Lee (2016), the same method of ranked dichotomization can also be found at the level of Divisions. The result is always a horizontal hierarchy in the above-mentioned sense of a value

ranking, even though it can also be depicted vertically, as the ranked main classes of the *Seven Epitome* in Figure 5.1. As characteristics of Classicist thought, hierarchization and dichotomy play also a key role in the last two main principles identified by Hur-Li Lee regarding the epistemic foundation of the *Seven Epitomes*.

The fourth principle, *knowledge perceived and organized as a unity*, states that the *Seven Epitomes* as knowledge organization system presents a holistic approach to the knowledge universe at the time. The traditional Chinese philosophy can be characterized as a "holistic worldview" (Lee 2010b, 5) perceiving the world as an organic whole. According to Lee (2010a), this way of thinking is extended into all areas of thought in ancient China, including the view towards knowledge. Summarizing a consensus of leading sinologists, Lee (2012a, 385 [excerpted]) highlights five aspects of knowledge in the Classicist tradition:

- knowledge must be useful,
- knowledge is unified, not fragmented;
- knowledge is hierarchical,
- knowledge is not discrete and thus must be contextual,
- knowledge is both personal and social.

This means that knowledge in ancient China is first and foremost related to moral knowledge. It is considered to be useful only if it is tied to actions leading to moral consequences. The unity of knowledge reflects the unity of the moral world, just as the hierarchy of knowledge reflects the hierarchy of the moral world. Knowledge is less concerned with discrete phenomena and isolated properties but more concerned with contextual relationships among phenomena. Finally, knowing how to act morally concerns not only the individual but also the family and the government. Everything is interconnected since the world is perceived as an organic whole.

Although the classificatory structure of the *Seven Epitomes* is not comprehensive in its scope, it can be regarded as being holistic in the sense that it reflects the Classicist holistic

worldview in which all knowledge is related to the supreme wisdom of the Way: "According to this point of view, the classification applied in the catalog is a unified scheme that has a focal class with five lesser, but unquestionably related classes" (Lee 2010b, 5). Scholars who specialize in a single Classic or dwell on interpretations of disjoint characters or phrases are criticized for their fragmentary approach. Indeed, Lee (2016, 151) finds "no trace of disciplinary thinking anywhere in the catalog." The ideal of a "unity of knowledge" (Lee 2016, 139) already appears to be the guiding principle for the book collation project in which all corrupted texts and the multiplicity of text variants are prepared for the "rebuilding of a unified text collection" (Lee 2016, 140).

The fifth and last principle, *correlative thinking connecting all text categories to a supreme knowledge*, states that all Epitomes and Divisions of the *Seven Epitomes* are connected to the wisdom of the Way derived from correlative thinking based on associations and analogies rather than from analytic thinking based on deductions and inductions. According to Lee (2016, 141) this principle is closely related to the holistic worldview:

> Chinese correlative thinking is a way to view the world as a complex system or structure consisting of elements that are interrelated with one another. Such thinking is often associated with the theories of *yin*, *yang*, and the Five Phases.

Like other Classicist scholars, the creators of the *Seven Epitomes*, Liu Xiang and Liu Xin, are heavily influenced by Yin Yang and Five Phases theories (Lee 2012a). The core idea of Yin Yang theories is that the world can be categorized into dualisms of seemingly opposites which appear to be complementary, interconnected, and interdependent. The words *yang* and *yin* refer to the original dualism of bright/dark—literally the sunny/shady sides of a hill (Schwartz 1985)—which is then correlated with a broad range of other dualisms like heaven/earth, summer/winter, day/night, action/inaction, ruler/minister, man/woman, father/son, older/younger, noble/base, giving/receiving, and so on (cp. Graham 1989). The first elements of these pairs are considered

to be superior to the second elements but in a relative way that allows the same element to be superior in one pair but inferior in another pair (e.g., man/woman but father/son, even if the son is already an adult man). Similarly, Five Phases theories correlate different typologies based on five categories. For example, five elements (i.e., wood, fire, soil, metal, water) are correlated with five seasons (i.e., spring, summer, transitional period, autumn, winter) and five cardinal directions (i.e., east, south, center, west, north) (cp. Graham 1989).

Lee (2012a, 391) argues that "correlative thinking can indeed be detected throughout the classification," whereas little, if any, traces can be found of logical procedures and analytic thinking. Even the introductory passages of the Collective Epitome apply "correlative language" (Lee 2016, 141) in that the Five Classics are correlated to five norms of conduct, five learnings, and the Five Phases themselves. A further example of correlative thinking is that all text categories are somehow connected to the Way. Many sectional introductions serve to connect diverse text categories, for example, by linking non-classic categories to the Classics, first and foremost to Confucius as the most important representative of the Classics.

In short, the findings of Hur-Li Lee's socio-epistemological approach demonstrate the need for a context-aware analysis that takes the epistemic foundation of a given knowledge organization system into account. As a cultural artifact, the *Seven Epitomes* should be understood in terms of its own sociocultural and historical context. Lee (2012b, 75) draws the following conclusion:

> The analysis confirmed that the *Seven Epitomes* is unscientific and illogical in that no scientific constructs or logical operations were used to develop the catalog's structure. That by itself, however, is no reason for considering the catalog or its approach as inferior or unworthy. On the contrary, the catalog is shown to be a deliberate design that reflects the epistemological frame of the time. Even more importantly, the catalog serves the need of the throne by binding texts with classicist morality and government functions.

5.1.2 A Methodological Critique

The main argument of this case study is that the socio-epistemological approach to knowledge organization, exemplified by Hur-Li Lee's study on the *Seven Epitomes*, restricts itself by methodological choice to the description of context-specific characteristics, whereas the proposed cognitive-developmental approach provides a comparative method that also allows to identify and to explain similarities and general regularities across different contexts. Thus, the latter helps to deal with the complexity of epistemic pluralism more systematically. However, the following methodological critique is not intended to reject the socio-epistemological approach in favor of the cognitive-developmental approach but to emphasize their complementary character. Indeed, a socio-epistemological analysis should be considered to be a necessary first step before a cognitive-developmental analysis.

Such a methodological extension of the socio-epistemological approach, or domain analysis in general, seems to be at least compatible with Lee's (2010a, 207) own "unique cultural perspective." Even though she emphasizes that her study is "not intended to be a comparison between East and West or between the ancient and the modern" (Lee 2016, 80), her monograph ends with the outlook that it "will hopefully aid in future comparative studies" (Lee 2016, 237). To illustrate the potential added value of the cognitive-developmental approach, Lee's (2012a, 379) methodology or "socio-epistemological framework" will be shortly recapitulated.

The starting point is the assumption that knowledge organization systems, such as the *Seven Epitomes*, are not neutral and objective representations but cultural artifacts that are deeply embedded in sociohistorical contexts and intended to serve certain pragmatic purposes. To understand the underlying conscious intentions of its creators, the "methodological choice of hermeneutics" (Lee 2016, XII) is made in the sense of a "hermeneutic inquiry into the catalog's epistemology and ideology, focusing specifically on the catalog's knowledge structure" (Lee 2016, 2). Besides the textual evidence (e.g., fragments of the *Seven Résumés*, *Han Treatise*,

reconstruction of the *Seven Epitomes*), Lee's and Lan's (2011, 33) "multidimensional framework" consults additional sources including biographic material of the catalog's compilers Liu Xiang and Liu Xin, as well as contextual information regarding the intellectual, political, and technological history up to the Former Han times. While Lee's (2016, 32) hermeneutic study rejects the "radical interpretive position," often linked to postmodernist approaches claiming that various interpretations of the same text are equally valid, she agrees with Mary Fulbrook's statement that progress in historical understanding is possible. The goal of her study is "to contribute to diversification and expansion of classification research" (Lee 2010a, 201) by showing alternatives to the prevailing analytic approach to bibliographic classification and thus illuminating the fallacy of universality (Lee 2010b). Her study of the culturally and historically distant *Seven Epitomes,* compared to current Western-oriented library classifications, emphasizes the "uniqueness of Chinese bibliography" (Lee 2016, 237) as a manifestation of a fundamentally different worldview. Against the background of a "cultural multiplicity" (Lee 2010a, 200), she argues that the creators of the *Seven Epitomes* are "neither correct nor incorrect in classifying texts" (Lee 2016, 72) because each knowledge organization system needs to be understood within its own context.

These methodological considerations appear to be limited to some extent. Most importantly, the assumption appears to be problematic that differences found between cultures can automatically be considered to present genuine culture-specific differences. While in many cases this conclusion may be valid, in other cases it might prove premature. For example, Lee's (2010b) distinction between a correlative approach and an analytic approach to classification might reflect a cultural difference between China and the West or a historical difference between ancient and modern times or even a function of something third. The decisive point is that the socio-epistemological approach offers no tools of analysis to verify or falsify such claims. This lack often leads to an overemphasis on the uniqueness of a sociohistorical context, as noted by

archaeologist Jeremy Tanner (2009, 89) in a comparative study of ancient China and ancient Greece:

> The emphasis on the uniqueness of the Classical world was only reinforced by post-structuralism and post-modernism, which in their strongest forms suggested that cultures, like languages, were fundamentally incommensurable, and thus not accessible to outsider knowledge, let alone comparable.

Regarding the example from above, Tanner shows that neither correlative thought is alien to Greek culture (e.g., the Pythagorean table of opposites) nor analytic or causal thought is alien to the Chinese culture (e.g., the Mohist logic). Instead of hypostatizing divergent cultural mentalities, Tanner (2009, 92) considers both ways of thinking as "two potentially available modes of cognition in each culture." With reference to Zong-qi Cai's comparative methodology, Tanner (2009, 104) argues for a combination of "intracultural," "cross-cultural," and "transcultural" approaches. As a first step, an *intracultural analysis* should examine a tradition in its own terms without imposing the investigator's perspective upon it. As a second step, a *cross-cultural analysis* should compare the differences and similarities between different traditions, avoiding the kind of premature comparisons that describes differences in terms of one tradition's lack of something that is considered to be the core of the other tradition. And finally, a *transcultural analysis* should open a more embracing interpretive horizon in which similarities and differences can be seen as context-specific choices from "general potentialities given in our 'common humanity'" (Tanner 2009, 104). According to Tanner (2009, 104), one advantage of this comparative methodology is to establish a "long-term developmental perspective" that avoids both the particularism of short-term or punctual cultural analyses and the cultural essentialism of approaches that neglect the dynamic change of a given tradition.

From this point of view, Hur-Li Lee's socio-epistemological approach presents the first step of an intracultural analysis that should be complemented by cross-cultural and transcultural

perspectives. The proposed cognitive-developmental approach is intended to offer these complementary methodological tools. The remainder of this case study will be concerned with what Lee (2016, 237) explicitly avoids, that is, a "direct comparison between the *Seven Epitomes* and its modern-day, Western-styled counterparts." As a prime example of such counterparts, the *Dewey Decimal Classification* will be chosen because it presents a strongly influential and currently world-wide spread bibliographic classification that is both modern and Western. The applied methodology goes beyond a socio-epistemological analysis in the following ways:

First, the findings of Lee's study of the *Seven Epitomes* (SE) will be compared to the characteristics of the *Dewey Decimal Classification* (DDC) to describe significant differences between both classification systems regarding their epistemic foundations. It will be argued that Lee's distinction between a correlative approach and an analytic approach to bibliographic classification presents an adequate description of SE and DDC.

Second, a long-term developmental perspective from ancient to modern times will be adopted to take the dynamic changes of both cultural traditions into account. It will be shown that the correlative approach can also be found, for example, in Western medieval library classifications, whereas the analytic approach is dominating in modern Chinese bibliography and cataloging.

Finally, the similarities and differences of both traditions will be compared against the background of the context-independent logic of development that can be found in various models of Integrative Levels of Knowing. This method is inspired by the comparative developmental approach by Heinz Werner and Bernard Kaplan (1956, 872) and their criticism of the cultural relativists:

> The contemporary Humboldtians [i.e., cultural relativists, M.K.] have typically concerned themselves with showing the varieties of language patterns in relation to world views.

> They have presented differences among languages and cultures without raising the question of whether these differences are orderable within a developmental sequence.

Such a comparative analysis requires a methodological shift from *empirical pragmatics* to *formal pragmatics*, as described in Chapter Three. While the socio-epistemological approach is concerned with the uniqueness of a given context using empirical-pragmatic analyses and traditional hermeneutics, the cognitive-developmental approach is interested in structural isomorphisms and general regularities across contexts using formal-pragmatic analyses and depth hermeneutics. Consequently, Lee's hermeneutic inquiry needs to be complemented by Habermas's hermeneutic reconstructionism that takes also rational reconstructions of context-independent developmental sequences or ILK models into account. This task requires the consultation of additional sources from a broad multidisciplinary field, including developmental psychology and developmental sociology, as well as comparative historiography, social anthropology, and cultural studies. It will be argued that the correlative approach of the *Seven Epitomes* and the analytic approach of the *Dewey Decimal Classification* do not simply reflect differences of unique sociocultural contexts but can be related to different integrative levels within given developmental-logical sequences of human cognition.

5.2 A Comparison of the *Seven Epitomes* and the *Dewey Decimal Classification*

5.2.1 The Correlative Approach and the Analytic Approach to Classification

Although Hur-Li Lee's research project on the *Seven Epitomes* is at pains to avoid cross-cultural comparisons between ancient Chinese and modern Western bibliographic classifications, there are many explicit hints and starting points for such a task. Frequently, the so-called "Classicist bias" (Lee 2016, 135) is contrasted to the "Western bias" (Lee 2016, 30), as the following

examples may illustrate. Regarding the explanation of classifications schemes, Lee (2016, 145) writes:

> His [Liu Xin's, M.K.] own explanation of the scheme in the Collective Epitome comprises only descriptions and analogies, rather than analyses and syntheses, and his scheme lacks taxonomic relations among concepts and categories that are characteristic of the common analytic thinking in the West.

After locating the roots of analytic thinking in ancient Greek epistemology, Lee (2012a, 379) explains:

> This analytic approach begins with identification of individual concepts and their properties. Concepts are placed into categories according to their shared properties, and categories are further aggregated into larger categories according to their shared properties.

Consequently, Lee (2012a, 394) identifies differences in the process of class-building: "Also missing from this classification [i.e., the *Seven Epitomes*, M.K.] is mutual exclusivity required for categories – a criterion in the Western classical theory of categories since Aristotle through to the mid-twentieth century." Then Lee (2012a, 392) summarizes: "Whereas taxonomic categories form the foundation of Western classification, it is thematic relations that dominate the scheme of the *Seven Epitomes*."

Regarding the authorship and authority, Lee (2016, 88) writes: "For the Chinese, who is speaking through a text is essential. This view differs from that of many Western thinkers from the twentieth century onward." Lee (2016, 229) further states:

> A notable distinction between the *Seven Epitomes* and the modern library catalog is the former's clear intent on exerting intellectual authority over the knowledge contents it represents. As for the present-day catalog, contemporary mainstream bibliographic

> theory makes no such claim or even suggestions and describes the catalog in objective terms.

Regarding the fixability or change-orientation of classification schemes, Lee (2016, 235) writes:

> In other words, those classifications [traditional Chinese library catalogs, M.K.] were never intended to be forward-looking or hospitable to new topics like their counterparts used in modern libraries with ever-growing collections.

Occasionally, there are even direct references to the *Dewey Decimal Classification* that is characterized, in contrast to the *Seven Epitomes*, as being a "disciplinary approach of universalistic classification" (Lee 2016, 152) with an "explicit statement that its purpose is to organize knowledge" (Lee 2016, 133), while exhibiting a "Western male bias" (Lee 2016, 154). She also emphasizes that the DDC serves as a role model for many other schemes all around the world, including modern library classifications in China like the *New Classification Scheme for Chinese Libraries*. Finally, Lee (2016, 124) concludes that "bibliographic classifications of today invariably take an analytical approach."

To outline such an analytic approach to classification, the example of the DDC and its epistemic foundation will be considered more closely. The *Dewey Decimal Classification* is developed by American librarian and educator Melvin Dewey since 1873 and published three years later with the subtitle: *A Classification and Subject Index for Cataloguing and Arranging the Books and Pamphlets of a Library* (Dewey 1876). According to Joan S. Mitchell and Diane Vizine-Goetz (2009), the DDC presents a general knowledge organization system that is continuously revised and used in 138 countries, applied in over 60 national bibliographies, and translated into more than 30 languages. Thus, the DDC can be considered to be the most influential and wide-spread library classification in modern times. Since the end of the 19th century and during the 20th century, its innovative decimal principle is adopted, for example, by

the *Universal Decimal Classification* (UDC), the *Korean Decimal Classification* (KDC), the *Nippon Decimal Classification* (NDC), and the *Chinese Decimal Classification* (CDC) (Šamurin 1977; Yi and Jin 1996; Oh 2012).

The decimal principle means that a classification notation is based on the decimal system of Arabic numerals. Accordingly, a classification scheme consists of ten main classes, each of them is divided into ten subclasses, which can be divided further into ten sub-subclasses, and so on. Dewey divides his scheme into nine main classes or Classes represented by powers of hundred (e.g., 100 Philosophy, 200 Theology, 300 Sociology), then into nine subclasses or Divisions represented by powers of ten (e.g., 310 Statistics, 320 Political Science, 330 Political Economy), and finally into nine sub-subclasses or Sections represented by single-digit numbers (e.g., 321 Patriarchal Institutions, 322 Feudal Institutions, 323 Monarchic Institutions). But Dewey also uses the ordinary significance of null or the zero power within the decimal system. This means that a "0" in the classification notation indicates a placeholder for a class of its own. For example, a book with the notation 320 refers to a class that is located in Class 3 and Division 2 but not restricted by a particular Section (i.e., Political Science in general). Likewise, the notation 050 (or short: 50) refers to a very generic class that is not restricted by one of the nine main classes but located within the additional Class 0, where it can be found in Division 5 and Section 0 (i.e., General Periodicals). The result is a ten-fold hierarchical classification that can be further subdivided according to the decimal principle to whatever extent is needed (see Table 5.4).

Table 5.4 Basic classification scheme of the *Dewey Decimal Classification* (1st edition).

Class (main class)	Division (subclass)
0	10 Bibliography 20 Book Rarities 30 General Cyclopedias 40 Polygraphy 50 General Periodicals 60 General Societies 70 --- 80 --- 90 ---
100 Philosophy	110 Metaphysics 120 --- 130 Anthropology 140 Schools of Psychology 150 Mental Faculties 160 Logic 170 Ethics 180 Ancient Philosophies 190 Modern Philosophies
200 Theology	210 Natural Theology 220 Bible 230 Doctrinal Theology 240 Practical and Devotional 250 Homiletical and Pastoral 260 Institutions and Missions 270 Ecclesiastical History 280 Christian Sects 290 Non-Christian Sects
300 Sociology	310 Statistics 320 Political Science 330 Political Economy 340 Law 350 Administration 360 Associations and Institutions 370 Education 380 Commerce and Communication 390 Customs and Costumes
400 Philology	410 Comparative 420 English 430 German 440 French 450 Italian 460 Spanish 470 Latin 480 Greek 490 Other Languages

(continued)

Table 5.4 Basic classification scheme of the *Dewey Decimal Classification* (1st edition).

Class (main class)	Division (subclass)
500 Natural Science	510 Mathematics 520 Astronomy 530 Physics 540 Chemistry 550 Geology 560 Paleontology 570 Biology 580 Botany 590 Zoology
600 Useful Arts	610 Medicine 620 Engineering 630 Agriculture 640 Domestic Economy 650 Communication and Commerce 660 Chemical Technology 670 Manufactures 680 Mechanical Trades 690 Building
700 Fine Arts	710 Landscape Gardening 720 Architecture 730 Sculpture 740 Drawing and Design 750 Painting 760 Engraving 770 Photography 780 Music 790 Amusements
800 Literature	810 Treatises and Collections 820 English 830 German 840 French 850 Italian 860 Spanish 870 Latin 880 Greek 890 Other Languages
900 History	910 Geography and Description 920 Biography 930 Ancient History 940 Modern Europe 950 Modern Asia 960 Modern Africa 970 Modern North America 980 Modern South America 990 Modern Oceanica and Polar Regions

Source: Based on Dewey (1876, 12).

Besides the decimal principle, the structure of the DDC is based on academic disciplines that are further divided into fields of study or *subjects*, except for some general classes in each Division that are based on the *form of treatment* (e.g., 102 Compends, 103 Dictionaries, 104 Essays). According to Dewey (1876, 6), the most important guiding principle for bibliographic classification is practical usefulness for the users of libraries, which means that each book should be put "under the subject to the student of which it would be most useful." All books on a given subject should be found together while the most nearly allied subjects should precede and follow. This disciplinary approach, however, is aware of the fact that every subject-based classification scheme is forced to put many minor subjects into categories to which they do not strictly belong. Therefore, Dewey (1876, 4) makes his premise very clear:

> In all the work, philosophical theory and accuracy have been made to yield to practical usefulness. The impossibility of making a satisfactory classification of all knowledge as preserved in books, has been appreciated from the first, and nothing of the kind attempted.

From a theoretical point of view, as Dewey admits, the ten-fold division of every discipline or subject appears to be quite arbitrary and the decimal principle even tends to "destroy proper coordination" (Dewey 1876, 4). For example, the subject Chess owns an entire Section in the same way as the subject History of England. But such disadvantages are accepted in favor of the simplicity and efficiency of the decimal notation and ten-fold hierarchical structure. The Arabic numerals also provide a "mnemonic aid" (Dewey 1876, 5) since they can be written, found, and memorized more quickly than traditional classification notations based on letters or combinations of letters and numerals. Even more important, the hierarchical structure of the classification is itself expressed in the notation, as Mitchell and Vizine-Goetz (2009, 8) observe:

> For a class within a given hierarchy, the next broader topic will generally be represented by a number one digit shorter, and subordinate topics will generally be one digit longer. Coordinate topics are usually represented by the same number of digits.

In this way, the classification notation reflects the "general-to-specific arrangement" (Mitchell and Vizine-Goetz 2009, 2) of disciplines or subjects and applies the important principle of hierarchical force. This principle means that the features of a given class also apply to its subordinate classes, a principle that characterizes genus-species relations. According to Olson (2009, 4810), this kind of hierarchy is "the logical result of arranging mutually exclusive categories in linear sequences," that is, from abstract to concrete. The principle of hierarchical force also allows that given classes can be further subdivided in the future when their subjects are getting more complex and needed to be more specified. Indeed, this is the case in more recent versions of the DDC, as the following example taken from the 23rd edition (Dewey 2011) shows:

500 Natural sciences and mathematics
  510 Mathematics
    516 Geometry
      516.3 Analytic geometry
        516.37 Metric differential geometries
          516.375 Finsler geometry

In a library catalog, the DDC abandons the principle of absolute location for arranging books on shelves in favor of the "relative location" (Dewey 1876, 6) by class numbers that also serve as location numbers: "In this system the catalogue and book numbers remain unchanged through all changes of shelving, buildings, or arrangement" (Dewey 1876, 8). Furthermore, in contrast to the literary warrant of the *Seven Epitomes* and its limited scope oriented on the imperial library collection, the DDC has a general scope and "provides a place for books on all subjects, whether

the library has them or not" (Dewey 1876, 43). This helps to explain why, unlike the SE's basic scheme, the DDC's count of subclasses is independent of the volume count of an individual library collection. In other words, both the principle of relative location and the general scope allow to use the same bibliographic classification and notation system for any library.

Another interesting feature of the DDC, as noted by Mitchell and Vizine-Goetz (2009), is that some notations in the Divisions and Sections are not used. For example, in the DDC's 1st edition, the Class 100 Philosophy shows neither entries for the Division notation 120 nor entries for the Section notations 101, 108, 114-129, and 164-169. The simple fact of the existence of empty classes in a bibliographic classification requires a logical conception of an empty set having no elements. This indicates not only a significant difference to ancient library catalogs like the *Seven Epitomes* but seems also to conflict with the idea of a unity of knowledge. An empty class makes only sense as a placeholder for future knowledge but within ancient China's closed worldview there is no significant future knowledge and everything is connected as an organic whole, which is why knowledge is considered to be not discrete and not fragmented. The DDC's lack of unity becomes already apparent by Dewey's disciplinary separation, his forward-looking change-orientation, and his privilege of practical usefulness over theoretical accuracy.

In order to compare the ideological and epistemological foundations of the DDC with Lee's findings regarding the SE, Wayne A. Wiegand (1998) offers a useful analysis of Dewey's thinking and the contextual forces that influences his classification structure. Dewey (1876, 10) admits that his nine main classes follow the "inverted Baconian arrangement" of the St. Louis Library developed by William T. Harris, and Wiegand (1998) shows further evidence of some influential precursors.

First, Dewey's decimal principle might be copied from geologist Philipps Blake, who organizes an exhibition into ten departments that are each subdivided into ten groups. Furthermore, the use of Arabic numerals seems to be influenced by Jacob Schwartz's system of

the New York Mercantile Library in which Arabic numerals are used for first and all subsequent divisions. But Wiegand (1998) also suggests that Dewey, as a modern reformer and advocate of the metric system, besides his own reform of a simplified English orthography, is already convinced of the simplicity, efficiency, and unlimited potential for expansions of the decimal principle.

Second, the adopted main classes from Harris's system are influenced by the philosophy of Georg W. F. Hegel, in which Francis Bacon's three faculties of the human mind (i.e., memory, imagination, reason) and the corresponding three categories of learning (i.e., history, poetry, philosophy) are inverted, giving more prominence to philosophy. According to Hope A. Olson (2009, 4807), this Bacon-Hegel tradition of classification oriented on the faculties of the human mind represents what she calls "epistemological warrant." According to Rodrigo de Sales and Thiago B. Piris (2017, 61), Bacon and Hegel agree that classification can be natural or non-artificial to some extent and able to represent reality rationally by adopting both "a deductive logic (from the general to the specific) and an inductive logic (from the specific to the general)." But as emphasized by library historian Evgenij I. Šamurin (1977), Bacon's idea that the three faculties of the human mind build a unity of knowledge is not taken over by Dewey's arrangement of distinct disciplines.

And third, the main motivation for Dewey's new system, originally developed for the Amherst College Library, is to support the education of students. Wiegand (1998, 183) writes:

> One of the jobs of any nineteenth century institution of higher education was to build character, and at Amherst—like most other New England colleges—the building blocks used to construct character came from a combination of Protestant orthodoxy and Western culture and classics. The curriculum was designed to communicate universal truths already known and unquestioned, not to expose students to contemporary political issues or even to sample contemporary literature.

According to Wiegand (1998, 183), Dewey's cultural milieu and its worldview can be characterized as a patriarchal White Western and Christian "Anglo-Saxonism" that highly values an objective and rational approach to knowledge. Similarly, Jens-Erik Mai (1999, 547) takes Dewey as an example of the "modern belief" that is characterized, in contrast to postmodern views, as a belief in the possibility to create an objective and neutral knowledge organization system.

These considerations allow a more direct comparison of the *Seven Epitomes* and the *Dewey Decimal Classification*, as depicted in Table 5.5 in which Hur-Li Lee's five main principles are taken as points of reference.

Table 5.5 Comparison of the *Seven Epitomes* and the *Dewey Decimal Classification*.

Seven Epitomes	Dewey Decimal Classification
1. Literary warrant	Epistemological warrant
Limited scope of imperial library collection	General scope of all knowledge in books
Count of subclasses depends on volume count	Count of subclasses independent of volume count
2. Government functions	Educational institution functions
Catalog's intent on exerting intellectual authority	Describing catalog in objective terms
Main classes related to imperial offices	Main classes based on academic disciplines
3. Worldview of *Ru* Classicism in Han times (China)	Worldview of Anglo-Saxonism in 19th century (USA)
Holistic worldview (closed)	Scientific worldview (open)
Unscientific, illogical	Scientific, logical
4. Unity of knowledge	Separate disciplines or fields of study
Organization based on thematic relations	Organization based on taxonomic categories
Hierarchy as value ranking	Hierarchy as genus-species relation
Fixed and stable scheme	Change-oriented scheme
No empty classes	Empty classes possible
5. Correlative thinking	Analytic thinking
Explanation based on description and analogy	Explanation based on analyses and syntheses
Reasoning based on association and analogy	Reasoning based on deduction and induction
Categorization based on relationships	Categorization based on isolated properties
Overlapping classes	Mutual exclusive classes
No strict class inclusion	Logical class inclusion (hierarchical force)
Principle of value dichotomy	Decimal principle

Besides the differences regarding functional aspects, such as the purpose of the library (government functions versus educational institution functions) and the scope of the bibliographic classification (literary warrant versus epistemological warrant), the most important differences between SE and DDC can be found in the structural aspects of the underlying ways

of thinking or worldviews. As noted by Lee (2012a; 2016), the holistic worldview characteristic for China during the Han dynasty and the conception of knowledge as a unity are derived from correlative thinking. In the same way, one might suggest that the scientific worldview characteristic for the West during the second half of the 19th century and the disciplinary approach to knowledge organization are derived from analytic thinking. Indeed, Hur-Li Lee's distinction between correlative and analytic ways of thinking can be considered to be an adequate description of the most significant differences between the epistemic foundations of SE and DDC.

This correlative/analytic distinction can also be found in different terminology in knowledge organization discourse. For example, Elin Jacob (2004) distinguishes between *categorization* and *classification*, and Uta Priss (2001) distinguishes between *associative representation* and *formal representation*. For Jacob (2004), a classification system is constituted by a hierarchical structure of well-defined and mutually exclusive classes arranged as genus-species relations, whereas a system of categorization consists of variable clusters of entities or overlapping classes that may or may not form hierarchical structures (see Table 5.6).

Table 5.6 The correlative/analytic distinction according to Elin Jacob.

	Categorization	Classification
Process	Creative synthesis of entities based on context or received similarity	Systematic arrangement of entities based on analysis of necessary and sufficient characteristics
Boundaries	Because membership in any group is non-binding, boundaries are "fuzzy"	Because classes are mutually-exclusive and non-overlapping, boundaries are fixed
Membership	Flexible: Category membership is based on generalized knowledge and/or immediate context	Rigorous: an entity either *is* or *is not* a member of a particular class based on the intension of a class
Criteria for assignment	Criteria both context-dependent and context-independent	Criteria are predetermined guidelines or principles
Typicality	Individual members can be ranked-ordered by typicality (graded structure)	All members are equally representative (ungraded structure)
Structure	Clusters of entities; may form hierarchical structure	Hierarchical structure of fixed classes

Source: Based on Jacob (2004, 528).

According to Jacob (2004), both systems have advantages and disadvantages. On one hand, systems of categorization are much more flexible and responsive to the context of use but they tend to prohibit the establishment of meaningful relationships between classes due to their fleeting and ephemeral character. On the other hand, classification systems are rather resilient to the context of use due to the rigidity of structure but they better serve as a means for the accumulation, storage, and communication of knowledge or information. Jacob (2004, 530) writes:

> The structure of a classification system provides a powerful cognitive tool—an external scaffolding—that minimizes the cognitive load on the individual by embedding information about reality through the organization of classes within the system.

Priss (2001) considers her distinction between associative and formal representations as similar to Jacob's distinction between categorization and classification. For her, the important difference is that even formal concepts are not always required to be mutually exclusive. In contrast to tree

hierarchies, concept lattices consist of formal concepts based on precise definitions while they can still be overlapping. For example, the concepts of *dog* and *pet* can be formally defined but their related classes of objects are overlapping since not all but some dogs are pets while not all but some pets are dogs. Her version of the correlative/analytic distinction is depicted in Table 5.7.

Table 5.7 The correlative/analytic distinction according to Uta Priss.

	Associative	Formal
Concepts are …	Fuzzy	Precise
Generated by	Emergence, *Gestalt* laws, bottom-up	Abstraction, design, top-down
Extensional features	Prototypes, exemplars	Set of "objects"
Intentional features	Stereotypes, image schemata, family resemblance	Formal definitions, formal logic rules
Relations	Association, similarity, contiguity, co-occurrence	Is a-hierarchy/lattice, logical, formal, causal
Reasoning	Association, induction, clustering	Inference, deduction, classification
Representation	Subsymbolic, emergent	Symbolic, designed by humans
In a context that is	Associative, local	Formal, general
Systems are	Probabilistic, dynamic, micro-level, continuous, "chaotic"	Correct, complete, macro-level, discrete
Metaphors	Biologically inspired (neural networks, evolution)	Information processing
Implementations	Fuzzy logic, learning-based	Formal logic, algorithmic, modular

Source: Based on Priss (2001, 54: Table 1).

Both Jacob (2004) and Priss (2001) criticize the limited focus of classification research on formal concepts or logical classes. With reference to cognitive psychologist Eleanor Rosch and her theory on prototypes in human cognition, Priss (2001) considers associative representation and formal representation as two complementary forms since the human mind combines both types of representation and seems to be able to shift between them seamlessly. Therefore, Priss (2001, 60) argues for more encompassing "multilevel approaches" to concepts and knowledge

organization systems that take both sides of the associative/formal distinction (i.e., correlative/analytic distinction) into account.

This appears to be important for cultural comparisons of knowledge organization systems. With reference to cross-cultural studies in linguistics, Priss (2001, 59) emphasizes existing "cultural differences in the degree of formality of concepts." Findings show that the use of formal concepts is less prevalent in cultures without a tradition of writing compared to cultures with a writing system. This suggests that the correlative/analytic distinction presents a structural difference of ways of thinking or forms of knowing that is not *per se* culture-specific but characteristic for two fundamental modes of cognition that are potentially available to the human mind in general, depending on specific technological or civilizational achievements. In the following section, these two approaches to classification will be considered from a cognitive-developmental perspective.

5.2.2 Classificatory Cognition and Integrative Levels of Knowing

In characterizing the correlative/analytic distinction, Lee (2010b; 2012a; Lee and Lan 2011) draws heavily on similar distinctions made by cognitive psychologists like Lawrence W. Barsalou (1992) and Steven A. Sloman (1996), as well as cultural psychologists like Richard E. Nisbett (2003) or Emma E. Buchtel and Ara Norenzayan (2009). This already indicates the importance of psychological approaches to classification or classificatory cognition for a deeper understanding of knowledge organization systems in their epistemic contexts.

The term *classificatory cognition* is intended here to embrace those cognitive aspects that are involved in the creation of knowledge organization systems, including classification systems that express themselves in language or other collective representations. Thus, classificatory cognition encompasses several distinct domains of cognition, most importantly, logico-mathematical operations (e.g., class-building, class-inclusion, identity, complementarity, transitivity) but also concept formation (e.g., categorization, prototype-building,

intension/extension coordination, genus-species relations), and further cognitive domains that constitute a broader worldview (e.g., symbolic representation, differentiation of validity spheres, moral judgment).

According to Lee (2010b; 2012a; 2012b), correlative thinking can be related to associative thinking and thematic thinking, as described in psychological literature. She refers, for example, to Sloman's distinction between associative and rule-based cognitive systems (see Table 5.8).

Table 5.8 The correlative/analytic distinction according to Steven A. Sloman.

Characteristic	Associative system	Rule-based system
Principles of operation	Similarity and contiguity	Symbol manipulation
Source of knowledge	Personal experience	Language, culture, and formal systems
Nature of representation		
Basic units	Concrete and generic concepts, images, stereotypes, and feature sets	Concrete, generic, and abstract concepts; abstracted features; compositional symbols
Relations	Associations	Causal, logical, and hierarchical
	Soft constraints	Hard constraints
Nature of processing	Reproductive but capable of similarity-based generalization	Productive and systematic
	Overall feature computation and constraint satisfaction	Abstraction of relevant features
	Automatic	Strategic
Illustrative cognitive functions	Intuition	Deliberation
	Fantasy	Explanation
	Creativity	Formal analysis
	Imagination	Verification
	Visual recognition	Ascription of purpose
	Associative memory	Strategic memory

Source: Based on Sloman (1996, 7: Table).

Likewise, she refers to Barsalou's distinction between thematic and taxonomic relations, in which the former is characteristic for cognitive frames or schemata that "represent spatial, temporal, causal, and intentional relations between entities and events in familiar situations" (Barsalou quoted in Lee 2012a, 392). In his cross-cultural study of Asian and Western ways of thinking, Nisbett (2003), to whom Lee also refers, provides rich material to illustrate the difference between thematic and taxonomic relations. A simple example is presented by a sorting task of three items like monkey, panda, and banana. While American participants show a preference for grouping based on common category membership in that panda and monkey belong to the same broader category of animal, Chinese participants show a preference for grouping based on thematic relationships in that monkey and banana belong together since monkeys eat bananas. Similar findings are described by Buchtel and Norenzayan (2009, 224) who distinguish between holistic and analytic forms of understanding: "East Asian cultures were most likely to use family resemblance than the single attribute as method of classification."

Although Lee equates correlative thinking to associative or thematic thinking described in psychology, it should be noted that she only refers to approaches that are concerned with synchronic analyses at the expense of a diachronic or developmental perspective. For example, Nisbett's (2003, XX) *The Geography of Thought* assumes that both Western and Eastern orientations present "a self-reinforcing, homeostatic system." Such a marginalization of dynamic change suggesting that significant differences in the way of thinking are merely the result of geography, that is, spatial or cultural distance, should be compensated by something that one might call *The History of Thought* that also takes long-term developments and alternative trends within cultural traditions into account.

In this section, it will be argued that the correlative approach and the analytic approach to classification can be related to different cognitive-developmental stages, as reconstructed by various domain-specific models of Integrative Levels of Knowing (cp. Kleineberg 2012). This

means that non-developmental conceptions of the correlative/analytic distinction should be complemented by developmental conceptions, and this for both the individual and the collective dimension (see Table 5.9).

Table 5.9 Non-developmental and developmental conceptions of the correlative/analytic distinction.

	Correlative approach	Analytic approach	Reference
Non-developmental			
Individual	Prototype classification	Logical classification	Rosch (1983)
	Thematic organization	Hierarchical organization	Barsalou (1992)
	Associative representation	Formal representation	Priss (2001)
	Categorization	Classification	Jacob (2004)
	Holistic thinking	Analytic thinking	Buchtel and Norenzayan (2009)
Collective	Emblematic thinking	Analytic thinking	Granet ([1934] 1985)
	Episteme of resemblance	Episteme of representation	Foucault ([1966] 1970)
	Symbolic classification	Hierarchical classification	Needham, R. (1979)
	Thematic relationships	Taxonomic categories	Nisbett (2003)
	Correlative thinking	Analytic thinking	Lee (2010b)
Developmental			
Individual	Complex	Concept	Vygotsky ([1934] 1986)
	Concrete classification	Abstract classification	Werner and Kaplan (1956)
	Collection (preoperational)	Class (operational)	Inhelder and Piaget (1964)
	Graphic grouping	Categorical classification	Luria ([1974] 1976)
	Resemblance sorting	Hierarchical classification	Hoppe, et al. (1977)
Collective	Mythic class-building	Empirical-theoretical class-building	Cassirer ([1925] 1955b)
	Complexive classification	Hierarchical classification	Hallpike (1979)
	Archaic classification	Logical-conceptual classification	Klix ([1980] 1993)
	Correlative thinking	Analytic thinking	Graham (1989)
	Correlative thinking	Analytic thinking	Bodde (1991)

It is important to note that even many non-developmental conceptions of the correlative/analytic distinction emphasize the fact that neither correlative thinking is restricted to the Chinese tradition nor analytic thinking to the Western tradition, as cultural essentialists like the sinologist Marcel Granet (1985) and his hypostatization of a genuine *Chinese thought* might suggest. For example, for the individual dimension, cognitive psychologist Eleanor Rosch's (1983) prototype classification, stating that categorization is graded and some subclasses are more central than others based on their similarity to a prototype or exemplar, can be found not only in East-Asia but all around the world. In fact, she originally identifies this form of human categorization in her research with samples of Westerners. Likewise, for the collective dimension, social anthropologist Rodney Needham (1979, 32) emphasizes that symbolic classification, taking the Chinese Yin Yang theory as a prime example, can be found at all periods in history and in every part of the world:

> Ethnographically, it is very remarkable that civilizations most distant from each other in time and space should have constructed practically identical dual classifications, composed of such standard oppositions as right/left, male/female, strong/weak, superior/inferior, light/dark, and so on.

In contrast to hierarchical classification, symbolic classification is based on symbolic classes that exhibit connections by analogy and do not need to be mutually exclusive. Members of a symbolic class do not necessarily share common features and a symbolic classification does not require genus-species relations. Interestingly, Needham (1979, 70) identifies both classification systems even within one and the same cultural tradition:

> The history of Europe alone shows that symbolic classification disintegrates or is very much reduced in scope in the face of scientific and technological advance. The medieval Englishmen lived in a civilization in which not only his religious life but even the way he plowed his fields was ordered by symbolic directives. The modern farmer acts within a

> pragmatic classification of the world, in terms of metereology, soil chemistry, the capacities of his machines.

Similarly, Michel Foucault (1970) distinguishes between two discourse formations in European history, the *episteme of resemblance* during the Middle Ages and Renaissance followed by the *episteme of representation*. In line with the characteristics of correlative thinking, he presents examples of the episteme of resemblance like hierarchies of analogy (e.g., continuous connection between plants, animals, and man) and total systems of correspondence (e.g., microcosm/macrocosm, theory of four elements). In contrast, the episteme of representation is exemplified by classification in natural history (e.g., Carl Linnaeus' *Systema Naturae*) and analysis in terms of identity, difference, inference, and proof by comparison, in one word, by rationalism.

It is also important to note that from a methodological point of view non-developmental conceptions to the correlative/analytic distinction can only *describe* individual, cultural, or historical similarities and differences of classificatory cognition but are not able to *explain* them. For example, they cannot explain why the correlative approach characteristic of ancient China can also be found in various other cultures. Likewise, they cannot explain why within one and the same cultural tradition like the European West both the correlative and the analytic approach can be found in different historical epochs, or even at the same time but in different social strata or under otherwise different circumstances.

This is what, for example, Foucault (1970) freely admits in his pure descriptive approach and what forces him to conclude that the transitions from one episteme to another are merely based on historical contingency. Even Rodney Needham's (1979) hints to the scientific and technological advance remain rather vague and cannot explain the structural transformation from symbolic classification to hierarchical classification, as part of a broader change of worldview. Therefore, approaches based on mere descriptions of contextual differences may acknowledge epistemic pluralism but are itself in danger to lead to epistemic relativism, as

analyzed in Chapter Two, taking the form of cognitive relativism (individual dimension), cultural relativism (synchronic collective dimension), and historical relativism (diachronic collective dimension).

Instead, developmental conceptions to the correlative/analytic distinction do not only describe contextual differences but can also explain them by taking recourse to rational reconstructions of learning processes in terms of stage or level sequences and their underlying logic of development. Anthropologist Donald E. Brown (1991, 46) calls such evolutionary or developmental sequences "implicational universals" because they imply a logical order of universal validity. He gives the example that the locomotive can only emerge after the wheel. This does neither mean that locomotives nor wheels exist in all cultures but that whoever wants to learn how to construct a locomotive, needs to learn first how to construct a wheel since the latter constitutes an integral part of the former. Brown (1991) rejects the simplifying assumption that universals can only be found in human biology, whereas human culture shows unavoidably variation. Indeed, developmental-logical sequences of Integrative Levels of Knowing present such implicational universals and offer thus a comparative framework that, to the extent that the underlying rational reconstructions are valid, is not itself context-dependent.

In the following, it will be argued that the correlative approach to classificatory cognition presents a developmental-logically earlier stage or level compared to the analytic approach. But it should be clear that this presumed logic of development says nothing about the chronological appearance of these approaches in history or individual biographies. On one hand, the dynamics of development is not predictable and can sometimes show regressive trends regarding cognitive abilities. On the other hand, developmental levels of knowing are integrative and preserve earlier cognitive abilities that can determine the dominant way of thinking under certain circumstances.

For a long time, the characteristics of correlative thinking are described by ethnographers, anthropologists, historians, and psychologists under a developmental perspective, often using a terminology like *archaic*, *magical*, *mythic*, *primitive*, or *pre-modern* mentality or worldview, in contrast to a modern worldview characterized as a more rational, logical, scientific, or reflexive one (Stern 1893; Wundt 1916; Lévy-Bruhl 1923; Frazer 1927; Kelsen 1946; Werner 1948; Frankfort 1951; Redfield 1953; Cassirer 1955b; Huizinga 1975; Hallpike 1979; Gurevich 1985). But this kind of terminology is highly problematic for at least two main reasons. First, terms like *primitive* bear undoubtedly pejorative connotations. Even though many authors use these terms according to their etymology in a strictly technical sense to denote the early stages of development, such a use of language should be avoided or at least reflected on today (for thoughtful discussions see Werner and Kaplan 1956; Barnes 2000; Hallpike 2011). And second, terms like *pre-modern* tend to conflate chronological and developmental-logical aspects. Temporal terms like *pre-modern* and *modern* (or *postmodern*, for that matter) define certain epochs in the chronology of history but appear to be inappropriate to denote levels of cognitive development. For example, since correlative thinking is still alive in contemporary societies, as many authors emphasize, it would be misleading to define this as a pre-modern phenomenon. Likewise, since analytic thinking can be found in ancient times, as the Mohist school in China or Aristotle in the West exemplify, it would be misleading to define this as a modern phenomenon.

From a methodological point of view, the differentiation between chronological and developmental-logical aspects is of utmost importance for developmental conceptions to the correlative/analytic distinction. As argued above, a mere *description* of ways of thinking in relation to their sociocultural context and historical change is insufficient to rationally reconstruct the underlying logic of development that alone might offer an *explanation* of the structural transformation from correlative thinking to analytic thinking. Therefore, developmental conceptions that take recourse to already existing rational reconstructions of

classificatory cognition appear to be the most promising methodological tools for cross-cultural comparisons. In the following, such developmental-logical approaches are described in more detail.

A rich source is presented by social anthropologist Christopher R. Hallpike (1979) who investigates the thinking and collective representations of contemporary indigenous cultures, with a special focus on classificatory cognition. He adopts a comparative perspective and refers extensively to developmental psychology, particularly, to the traditions of Jean Piaget and Lev S. Vygotsky. In correspondence to the correlative/analytic distinction, Hallpike (1979, 178–79) distinguishes two modes of classificatory cognition that he calls "complexive classification" and "taxonomic classification."

The complexive classification is named after Vygotsky's phrase "thinking in complexes," that characterizes a developmental stage in his model of concept formation leading from syncretism to thinking in complexes or pseudoconcepts to protoconcepts to true concepts (see Appendix B: Table B.44). In contrast to the first stage of *syncretism* in which the child puts objects together in an unorganized congeries or heap because subjective impressions are mistaken for real relations, the second stage of *thinking in complexes* enables a kind of grouping in which the objects are defined by objective factors, such as appearance, use, association, and function.

For Vygotsky (1986), family names present a prime example of complexes. Just like family names subsume individuals that belong together into separate families, complexes subsume individual elements like objects, events, or phenomena that belong together into separate complexes. The bonds between elements of a complex are concrete and factual rather than abstract and logical, while any factually present connection, association, or analogy may lead to the inclusion of an element into a given complex. Obviously, the idea of thinking in complexes anticipates Wittgenstein's (2010, 36) idea of "family resemblances," in which different language games (complexes) subsume communicatively used words or concepts (elements) that belong

together, even though the underlying family resemblance cannot strictly be defined by a set of common properties.

According to Vygotsky (1986), there are different types of complexes, most importantly, the associative complex, the functional complex, and the chain complex. The most elementary type, the *associative complex*, is based on mental associations where the underlying criteria for the inclusion of an element are not defined by a single criterion but by a thematic relatedness. For example, a complex can include such elements as a bird, a bush, a house, and a car based on the common association that a bird sits on a bush, a bush grows next to a house, and a car parks outside a house. According to Hallpike (1979, 203), associative complexes are typical for indigenous cultures that "tend to classify their universe into 'realms' such as 'things of the forest', 'things of the village', 'things of the sea', and so on." Associative complexes present what Lee (2010b) refers to as groupings based on thematic relationships. In the *Seven Epitomes*, the Epitome of Six Arts, for example, can be considered to be an associative complex that groups documents together based on their direct association to the supreme wisdom of the Way, despite their above described different nature.

The next type, the *functional complex*, is based on functional complementarities between elements based on their participation in a practical operation. For example, items like cups, saucers, and spoons, or different items of clothes complement each other, while serving the same function, such as drinking or dressing. Functional complexes present what Lee (2016) refers to as correlative thinking exemplified by Five Phases theories. Each typology of five categories, such as five seasons (i.e., spring, summer, transitional period, autumn, winter) and five cardinal directions (i.e., east, south, center, west, north), groups elements that complement each other with regard to the same function, such as periodization or spatial orientation. In the *Seven Epitomes*, the typology of the Five Classics, for example, seems to echo this principle. A further

example is presented by the principle of government functions that is more important than topical similarity to group documents.

Finally, the purest type of thinking in complexes, according to Vygotsky (1986), is presented by the *chain complex* that is built by a dynamic and consecutive joining of individual links into a single chain. For example, when a child is given a yellow triangular block as original sample and asked to pick other blocks that are alike, the child may pick a few triangular blocks but after a while, the child's focus of attention can switch to the blue color of the block just added and then the child picks blue blocks regardless of the shape for a while, before the criterion of selection may change again. This is because a new element enters the complex with all its attributes since single properties like color or shape are not yet abstracted from the element. Consequently, each attribute of the new element can be a potential new criterion that is equally important as the original criterion for the inclusion of further elements into the complex, resulting in new links into an ever-growing chain. Chain complexes present what Lee (2016) refers to as correlative thinking exemplified by Yin Yang theories. Each dualism like heaven/earth, summer/winter, day/night, or ruler/minister, man/woman, father/child constitutes a single link within the chain complex of Yin Yang derived from an attribute that may have something in common with a previous link but not necessarily with the whole chain. This type of grouping is aptly called "classificatory current" by Rodney Needham (1979, 67) and described as an indefinitely extendable "stream of correlation" by sinologist Agnus C. Graham (1989, 322).

In general, the distinctive characteristic of all thinking in complexes, according to Vygotsky (1986), is that a *complex*, unlike a true *concept*, does not rise above its elements in the sense of abstraction but merges with the concrete objects, events, or phenomena that compose it. This means a fusion of the complex and its elements, the general and the particular. Consequently, the pattern of reasoning is neither inductive (i.e., from particular to general) nor deductive (i.e.,

from general to particular) but transductive (i.e., from particular to particular). As Hallpike (1979, 15–16) put it:

> Transductive reasoning ignores either the whole in favour of the parts (juxtaposition) or the parts in favour of the whole (syncretism) because the child is unable to think simultaneously of the parts as separate things *and* of the relations that unite them into larger wholes.

The concept of "transduction" denoting a kind of reasoning that lacks logical necessity is coined by Piaget (1977, 106) who ascribes the invention of the term to William Stern. The underlying analogical reasoning (*Analogieschluss*) is analyzed by Stern (1893, 71 [my translation from German, M.K.]) in this way:

> Premises: M has property P.
> S equals M in properties *a*, *b*, *c* …
> Conclusion: Therefore, S probably also has property P.

For Stern, this analogical reasoning builds the foundation of mythological thinking in that, for example, external natural processes are transductively correlated to those of the human body or human behavior, as known from the principles of personification and anthropomorphism. Similar examples of transduction that move from particular to particular are also described early by ethnographers and anthropologists, for example, by Lucien Lévy-Bruhl (1923, 35) as "mystic participation" (*participation mystique*), and by James G. Frazer (1927, 223) as "sympathetic magic" based on the law of similarity and law of contact. According to Richard A. Shweder (1977, 648), this so-called magical thinking, which he also identifies in everyday thought, "is inductive in its intent but mistaken in its conclusion." He argues that this leads typically to a confusion of propositions about the world and propositions about language, that is, a confusion of co-occurrence likelihood (empirical relationship) and likeness or resemblance (conceptual affiliation).

Vygotsky (1986, 128) observes some structural similarities of this kind of reasoning, often referred to as "participation," in indigenous cultures, children, and mentally ill people, illustrated by examples from the works of Jean Piaget, Lucien Lévy-Bruhl, and Alfred Storch. Participation means a relation of partial identity or close interdependence between two or more objects, events, or phenomena that have no recognizable connection (cp. Appendix B: Table B.46; Appendix C: Table C.2). A famous example is that the members of the Bororo tribe of Brazil claim to be red parrots, not merely in the sense of a common name or a relationship but as a matter of identity and belonging together. For Vygotsky (1986), the phenomenon of participation can be explained by the principles of thinking in complexes based on pseudoconcepts instead of true concepts. In complex thinking, a given element can be included simultaneously in different complexes based on its different concrete attributes. Consequently, one and the same element can have several names or identities, depending on the complex that is activated at the time. In opposition to true concepts defined by a common set of abstracted properties, pseudoconcepts refer to a "family name for a group of concrete objects belonging together, not logically, but factually" (Vygotsky 1986, 129). Thus, the idea of *belonging together* is markedly different in thinking based on complexes compared to thinking based on concepts.

The same conclusion is drawn by Inhelder and Piaget (1964) in their investigation of the growth of logico-mathematical thinking with a focus on classificatory cognition in children (see Appendix B: Tables B.36, B.37). Inhelder and Piaget (1964, 8) distinguish strictly between "class membership" and "partitive membership" or "schematic membership," a distinction that Hallpike (1979, 179) refers to as "similarity" and "belonging."

Class membership is a relation between an element *x* and the class *A* in which it is a member, while class *A* is defined by the inclusion of all the elements having property *a* and only elements having property *a*. For example, the individual dog called Fido is a member of the general class of all dogs because he exhibits all necessary and sufficient properties attributed to

dogs like being a domesticated carnivorous mammal, originating from wolves, having an acute sense of smell, a barking voice, and so on. In contrast, *partitive membership* is a relation in which an element *x* is only a spatial part or piece of a whole, like a nose belongs to the face. In a similar way, *schematic membership* is a relation in which an element *x* is identified with a perceptual or sensori-motor schema based on assimilation by recognition, like a dog that is recognized as such based on previous experiences and the resemblance to a mental image of a prototypical dog. The crucial point, according to Inhelder and Piaget (1964), is that the understanding of class membership requires the cognitive-developmental competence to use concrete operations, whereas the understanding of partitive or schematic membership is also possible at a preoperational level since it is primarily based on perception (see Appendix B: Table B.37).

Therefore, Inhelder and Piaget (1964, 49) distinguish between an abstract logical "class" and a perception-based pre-logical "collection." They argue that there is an important difference between the division of a collection into subcollections compared to the division of a class into subclasses since only the latter implies a hierarchical structure of class-inclusion. This class/collection distinction, which will be described below in more detail, is important for an understanding of the structure of the *Seven Epitomes* because its subunits, the Divisions, apparently do not present subclasses in the logical sense but merely subcollections that lack the principle of class-inclusion and, therefore, the principle of hierarchical force. A further difference between class and collection is that a singular class containing only one element and an empty class without any elements at all contradict the idea of a collection which is always perceived as a group of elements. According to Inhelder and Piaget (1964), the use of singular classes requires concrete-operational cognition, whereas the use of empty classes even requires formal-operational cognition that is able to abstract from concrete items and allows hypothetical reasoning. Thus, the lack of logical operations that Lee identifies for the *Seven Epitomes* seems to indicate that this classification is primarily based on preoperational thinking, a level of

cognition that is not sufficient yet to exhibit features like the decimal principle based on class-inclusion and hierarchical force, or the possibility of empty classes, as known from the *Dewey Decimal Classification*.

Inhelder and Piaget (1964) argue that the central problem in the development of classificatory cognition is the understanding of class-inclusion which requires the coordination of intension and extension. While the qualitative term *intension* means the set of necessary and sufficient properties that define a concept or a class, the quantitative term *extension* refers to the total number of elements that are denoted by a concept or included as members of a class. The decisive point is that such a logically defined class can never be perceived as such because it generally has an indefinite extension. For example, one can recognize an individual dog as a dog based on schematic membership but this involves only intension without consideration of extension since one cannot *see* or otherwise perceive all elements that belong to the class of dogs, including those that existed in the past or will exist in future. Instead, the understanding of a logical class requires to abstract from spatio-temporal conditions and to apply cognitive operations beyond mere perceptions.

As described in Chapter Four, Piaget (1977, 354) defines operations as "internalized actions that become reversible," which means thought processes that transform a state *A* into a state *B* leaving at least one property invariant throughout the transformation and allowing the reverse operation from *B* to *A*. As also described in Chapter Four, the example of transformed balls of clay demonstrates that at a preoperational level such transformations are conceived without any conservation, which makes it impossible to return to the point of departure. The required new cognitive abilities for this task emerge first at the level of operational thinking and can be illustrated by a few examples regarding hierarchical classification (see Figure 5.2).

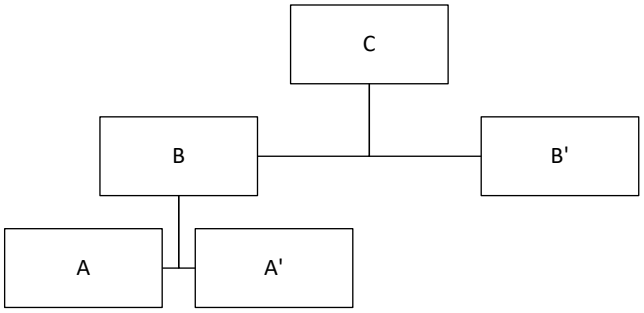

Figure 5.2 Hierarchy of classes (based on Hallpike 1979, 20: Figure 2).

From the hierarchy of classes in Figure 5.2, which presents the foundation of hierarchical or logical classification, can be derived a series of *a priori* and logically necessary relations that are independent of experience or perception. These logical relations constitute an integrated system of transformations, as listed by Hallpike (1979, 21):

$A < B < C$; $A < C$

$C > B > A$; $C > A$

$B \begin{cases} < C \\ > A \end{cases}$

$B > A$

$A + A' = B$, therefore $A = B$ - A', $A' = B$ - A

All B is some C

Some B is all A

$A + A' + B = B$, or $B + B = B$

Operational thinking allows, for example, to understand relations of transitivity (e.g., if $A < B < C$, then $A < C$), complementarity and reversibility (e.g., $A + A' = B$, therefore $A = B - A'$ and $A' = B - A$), identity (e.g., $A + A' + B = B$ or $B + B = B$) and, most importantly, class-inclusion (e.g., All B is some C and some B is all A). The achievement of these operations indicates a milestone in the development of hierarchical categorization in children (Hoppe, Schmid-Schönbein, and Seiler 1977; Blewitt 1994; Müller, Sokol, and Overton 1999). According to Pamela Blewitt's (1994) summary of the literature on the Piagetian class-inclusion task, this

milestone marks two main cognitive-developmental stages, first the ability to form categories at different levels of generality, and second the ability to include the same object into multiple categories. The more advanced stage of development can also be characterized by the ability to apply the "multiple membership rules" and "inclusion rules" (Kofsky quoted in Hoppe, Schmid-Schönbein, and Seiler 1977, 80), which means to understand that an element can be a member of two or more classes simultaneously and that all elements of a class present some elements of its superordinate class. However, Blewitt (1994) emphasizes that children who realize, for example, that the dog Fido is also an animal are far from a full understanding of the hierarchical structure of class-inclusion and the quantitative implications of genus-species relations, which require the grasp of the quantifiers *all*, *some*, *none*, and the relations *more than*, *less than*, and *equal to*.

In this regard, Hallpike (1979, 280) notes that studies of folk taxonomies often focus solely on the intension of classes at the expense of their extension and the logical quantification of class membership. Simply because informants may use words like *all* and *some*, "it does not follow that their indigenous users grasp the logical, as opposed to the concrete, implications of these terms." This can also be illustrated by Luria's (1976, 108–9) field study among illiterate Uzbek peasants, to which Hallpike also refers, and the finding that uneducated adults often lack an understanding of logical quantification in syllogisms and seem to be resistant to make deductions from hypotheses:

> *The following syllogism is presented*:
> In the Far North, where there is snow, all bears are white. Novaya Zemly is in the Far North and there is always snow there. What color are the bears there?
> "There are different sorts of bears."
> *Failure to infer from syllogism. The syllogism is repeated.*
> "I don't know; I've seen a black bear, I've never seen any others … Each locality has its own animals: if it's white, they will be white; if it's yellow, they will be yellow."

Appeals only to personal, graphic experience.

But what kind of bears are there in Novaya Zemly?

"We always speak only of what we see; we don't talk about what we haven't seen."

The same.

The same study also shows a clear correlation between increasing education and an increasing trend from classifying objects in terms of graphic groupings based on complexes towards categorical classification based on true concepts or logical classes (see Table 5.10):

Table 5.10 Groupings and classification.

Group	Number of subjects	Graphic method of grouping	Graphic and categorical methods of grouping	Categorical classification
Illiterate peasants from remote villages	26	21 (80%)	4 (16%)	1 (4%)
Collective-farm activists (barely literate)	10	0	3 (30%)	7 (70%)
Young people with one to two years' schooling	12	0	0	12 (100%)

Source: Based on Luria (1976, 78: Table 7).

These considerations should allow a re-evaluation of Lee's (2012a, 378) claim that the ancient Chinese classicists are "fully aware of taxonomically hierarchical relationships (both instance and whole-part) as observed through perception." She gives one example of a genus-species relation (*hu* and *lian* [unfortunately both Chinese terms are not translated into English, M.K.] as two types of vessels for practical use, as mentioned in the *Analects*) and one example of a whole-part relation (a shoulder is part of the human body, as mentioned in the *Mencius*). But both of them are insufficient evidence to proof an understanding of taxonomic hierarchies. On one hand, whole-part relations of concrete objects like a human body and a shoulder can already be understood at the preoperational level since there is no involvement at all of taxonomic hierarchies based on class-inclusion. On the other hand, genus-species relations cannot be

observed through perception, as claimed by Lee, but require cognitive operations in the Piagetian sense. To realize that *hu* and *lian* are vessels is analogous to the realization that Fido, the dog, is also an animal. Again, this is far from a full understanding of the hierarchical structure of class-inclusion and the quantitative implications of genus-species relations.

As Lee (2012a) herself emphasizes, there is little evidence that the Classicists, with a few exceptions like the Mohists and Xunzi, apply logical operations in their works. However, her conclusion that during the Han dynasty the Chinese prefer correlative thinking but are not incapable of analytic thinking seems to be insufficiently grounded. From a cognitive-developmental perspective, the lack of logical operations does not necessarily indicate a cultural preference but could also indicate the contemporary developmental status of cognitive capabilities. This question is hard to answer because it is closely related to the difficulty to distinguish between performance and competence. Against the assumption that mainstream Chinese intellectuals in ancient times have the competence to use logical operations but prefer not to perform them in symbolic expression speaks the fact that translations of imported Indian writings on logic, beginning in the 7th century CE, are full of errors and misunderstandings (Nakamura 1985; Nisbett 2003).

But there is no need to speculate about this competence/performance problem since it does not change the finding that the predominant way of thinking manifested in ancient Chinese symbolic expressions, such as the *Seven Epitomes*, is primarily based on preoperational cognition. This does not even contradict the exception that some works of a few intellectual elites show a breakthrough to more advanced levels of cognition, a breakthrough though that seems to find little resonance in the broader society.

This view is supported by Hallpike (1979) who concludes that the distinction between *complexive classification* and *taxonomic classification*, as another terminology of the correlative/analytic distinction, can be clearly related to different cognitive-developmental

stages, particularly, to Vygotsky's transition from *complex* to *concept* within his model of concept development, and to Piaget's transition from *collection* to *class* or from preoperational to operational thinking within his model of logico-mathematical development. From this developmental point of view, it becomes evident why Hallpike's (1979, 202) explanation of developmental-logically early forms of classification in recent indigenous people shows some striking similarities to the ancient Chinese library classification *Seven Epitomes*:

> Since primitives base their classification primarily on complexes derived from the functional and associational relations between things experienced in real life rather than on logical class and taxonomic criteria, it is inevitable that while it will be possible to construct hierarchical classificatory systems with large general categories divided into more particular categories, such systems may be based on shifting criteria and may contain overlapping classes and classes that are not united in any superordinate class.

In many respects, Hallpike's (1979) analysis of complexive classification is in large agreement with Lee's (2016) findings regarding the *Seven Epitomes*. However, the decisive advantage of his developmental conception of the correlative/analytic distinction is to be able to take cultural comparisons based on a developmental sequence of classificatory cognition into account. In particular, Hallpike (1979) argues that there is no evidence that thinking and collective representations in indigenous people—or in other historical epochs, as cognitive psychologist Friedhart Klix (1993) suggests—employ a completely *different* logic compared to the prevalent modern Western thinking, an assumption that, for Hallpike's awareness, could not be demonstrated yet. Hallpike's (1979, 490) cognitive-developmental perspective rather suggests an *incomplete* logic that makes much less use of cognitive operations and appears to be much less rational:

> To the extent that primitive thought is bound up in imagery and the concrete, phenomenal properties and associations of the physical world, permeated by moral values and affective

> qualities, uncoordinated, dogmatic and unsubstantiated by argument, static, relying on perceptual configurations and prototypes and the reification of process and realms of experience, it is not "rational" according to these criteria.

However, this does not mean that correlative thinking (i.e., preoperational thinking or thinking in complexes), as a developmental-logically early form of reasoning, needs to be described exclusively in terms of a lack of something, such as a lack of concrete and formal operations. Correlative thinking can be rationally reconstructed and explained according to its underlying generative structure. Compared to operational thinking or thinking based on true concepts this cognitive deep structure presents a qualitatively distinct way of thinking based on the principles of participation and transduction. As such, it makes perfect sense to its users and a depth-hermeneutical analysis of the underlying structure enables the interpreter to understand symbolic expressions based on correlative thinking.

Therefore, Hallpike (1979, 490) emphasizes that preoperational thinking "is not 'absurd' or 'mistaken' but rather of limited generality." This statement is in agreement with Lee's (2012b) conclusion that correlative thinking is unscientific due to its lack of logical operations but not unworthy or inferior since it has its own strength and value for certain purposes. Hallpike (1979) too stresses the fact that preoperational thinking is quite capable of solving practical problems of daily life and appears to be particularly well adapted to the requirements of social relations, where values, affect, and participation in action are more important than explicit verbal analysis, abstract generalizations, and reversible mental transformations, not to mention that preoperational thinking is predominant in art, imagination, practical knowledge, feelings, values, and faith, which present essential aspects of all human societies.

The rational reconstruction of an overarching developmental sequence of classificatory cognition that includes both correlative thinking and analytic thinking as distinct stages or levels is also supported by empirical research (Hoppe, Schmid-Schönbein, and Seiler 1977; Neimark

1983; Halford, Andrews, and Jensen 2002; Fujita 2012). Edith Neimark (1983, 117), for example, identifies concrete-operational cognition as the decisive requirement of logical classification and "supports the view that prototypical classification is ontologically [*sic*, it should read "ontogenetically," M.K.] earlier and phylogenetically more primitive than logical classification."

This can be made also plausible by taking recourse to rational reconstructions of some broader cognitive domains compared to Inhelder's and Piaget's logico-mathematical operations and Vygotsky's concept formation. For example, Merlin Donald's (2012; see also Appendix C: Table C.5) distinction between mythic and theoretic stages within his developmental model of cognition and culture apparently captures the correlative/analytic distinction fairly well (see Table 5.11):

Table 5.11 Mythic and theoretic styles of cognitive governance.

Mythic	Theoretic
Narrative	Analytic/paradigmatic
Authority-based	Evidence-based
Slow, deep	Fast, shallow
Inner focus	Outer focus
Implicit analog logic	Explicit symbolic logic
Highly emotive	Much less emotive
Closed beliefs	Open-ended beliefs
Allegorically grounded	Analytically grounded
Largely oral mediation	Largely technological mediation
Fixed, stable	Change-oriented, unstable

Source: Donald (2012, 71: Table, 3.3).

According to Donald (2012, 70), the transition from mythic to theoretic cognition and culture can be described as an "evolutionary trend in the direction of institutionalized analytic thinking" that takes place as an initial historical shift during the so-called Axial Age, consolidates itself in the

last two centuries, and is still not completed yet. Indeed, the debate on the Axial Age presents an interesting test case for the methodological contribution of a cognitive-developmental approach and should be considered more closely.

The term *Axial Age* (*Achsenzeit*) is invented by philosopher Karl Jaspers (1956) to denote deep-seated intellectual and cosmological shifts that take place roughly at the same time, between the 8th and the 2nd century BCE, in various, largely independent cultures and manifest themselves, for example, in the thought of Confucius and Mencius in China, Buddha in India, the Hebrew prophets in Palestine, and the philosophers in Greece. These cultural transformations are related to the emergence of the great world religions and new political orders, while their characteristic features are described, for example, as transition from mythos to logos and towards a reflexive, critical awareness of being as a whole (Jaspers 1956), as break up with mythological thought and the search for first principles (Nakamura 1975), as transcendental breakthrough to new spiritual, intellectual, and ethical responses (Schwartz 1975), as second-order thinking and tension between the transcendental and the mundane order (Eisenstadt 1986a), as movement from ethical conventionalism towards independent ethical positions (Harbsmeier 2005), as increasing reflexivity, historical consciousness, and agentiality in the sense of an awareness of the potentials of human action within the bounds of human temporality (Wittrock 2005), as new forms of symbolization that express universal aspirations (Jung 2012), and as revolution of worldview and cognitive breakthrough towards a transcending of mythological awareness of self and world (Habermas 2019).

Many authors argue that the term *Axial Age* is misleading because it should not be considered as a specific historical epoch in world history but rather as an indicator of major societal transformations that show striking similarities in different cultures (Nakamura 1975; Eisenstadt 1986b; Harbsmeier 2005; Wagner 2005; Assmann 2012). Therefore, the preferred terms are “axial transformation” (Wagner 2005, 103), or “axiality” and “axialization” in analogy

to globality and globalization (Assmann 2012, 400). In other words, the aspect of synchronicity of axial transformations should not be regarded as decisive for the concept of *axiality* that is even by critical voices within the debate considered to be an "indispensable tool in the comparative study of cultures" (Assmann 2012, 375). For example, Shmuel N. Eisenstadt (1986a) speaks of an axial breakthrough even in Islam that takes place almost a millennium after what is commonly referred to as the classical Axial Age.

Consequently, Eisenstadt's (2005, 531) distinction between "chronological" and "typological" aspects directs the focus of analysis on the structural change and demands a "view towards transformative logics" (Thomassen 2010, 336). This is exactly what a cognitive-developmental approach is able to offer since it reconstructs these intellectual and cosmological shifts against the background of developmental-logical sequences of human cognition. In fact, axial transformations are often described and explained with reference to Piaget's transition from preoperational to mature concrete-operational and early formal-operational cognition, as well as Kohlberg's transition from conventional to postconventional moral judgment (Habermas 1984; Apel 1988; Roetz 1993; Bammé 2011; Dux 2011). Further examples of developmental-logical references for axial transformations are Habermas's (1979) transition from mythological to rationalized worldview, Barnes's (2000) transition from archaic to classical or axial culture, Bellah's (2011) transition from symbolic to conceptual representation or from archaic to historic religions, and Donald's (2012) transition from mythic to theoretic cognition and culture (see also Appendix C: Tables C.1, C.2, C.5, C.10; Appendix D: Tables D.1, D.2).

From this cognitive-developmental perspective, the concept of *axial transformation* can function as a point of reference for the comparison of long-term developments in China and the West. As noted by Graham (1989), it is a common place that in ancient times rational demonstration has a much smaller place in Chinese thought compared to Greek thought. Nevertheless, one can speak of genuine axial transformations in China between the late 6th and

the early 3rd century, exemplified by Confucius's universal ethics and skeptical attitude against supernatural events, Mozi's expression of second-order thinking and logical principles, as well as Zuangzi's break with conventional epistemological and moral views (Elvin 1986). Other representatives of axial breakthroughs often mentioned are the Confucians Xunzi and Mengzi (Barnes 2000; Wittrock 2012).

In general, axial transformations in China are not accompanied by dramatic break ups with the cultural tradition but are often derived from the use of old ideas in new ways (Bellah 2011). As noted by Elvin (1986), for example, the meaning of the concept of Heaven (*tian*) changes from an anthropomorphic supreme deity to an amorph and unspeaking supreme principle, later also associated to the Way (*dao*). While the archaic, preaxial China is characterized by the worship of deities and a belief in nature spirits of mountains and rivers, and in powerful ancestors, the axial transformations show a clear trend towards universalizing thought, analyzing language in critical reflection, and seeking an ultimate principle, such as the Confucian principle of humaneness (*ren*) or the Daoist principle of the Way (*dao*) (Elvin 1986; Barnes 2000; Jung 2012). This long process from polytheism, as manifested in brief stories and folktale myth of relative brevity and lack of logical connection, towards universalism, often expressed in orderly essays like the *Mozi*, is related by Barnes (2000) to the transitions from preoperational to operational thinking and from conventional to postconventional morality.

In order to describe the historical context of the *Seven Epitomes*, Lee (2012a, 386) refers to this intellectual shift in this way:

> As Chinese society experienced a long process of rationalization in early times, knowledge possessed and practiced by shamans (*wu*), diviners (*bu*), astrologers (*shi*), physicians (*yi*), and so on that was passed down orally, mostly from father to son, gradually lost its privilege.

As described in Chapter Three, this indicates what Habermas (1984, 68) calls "devaluative shifts" related to the emergence of a new level of justification in which not this or that traditional reason but the *kind* of reason is no longer convincing. As Lee and Lan (2011) write, this process of rationalization is closely related to the new social group of an intellectual elite that may function as catalyst for the intellectual shift. However, it is not only important to recognize that these new cognitive abilities are distributed very unevenly among ancient Chinese society but also that in many ways the intellectual history after these axial transformations until the Han dynasty and the creation of the *Seven Epitomes* needs to be described in terms of cognitive regression. For example, historian Cho-Yun Hsu (1986, 316) argues that the result of Emperor Wu's establishment of Confucian orthodoxy is an "inevitable degeneration and vulgarization" of early Confucianism. According to Hsu (1986), political interests dominate the interpretation of works of the mythified Classics, which are supplemented by superstitious materials known as prognostic and apocryphal texts, often taken as prophecy. In this way, Han Confucianism presents a mixture of very different traditions and integrates Yin Yang theories, Five Phase theories, and theories of the correspondence between macrocosm (i.e., universe, natural world) and microcosm (i.e., human body, human behavior, human world), resulting in a "mythical mist" (Hsu 1986, 320). The conclusion drawn by Hsu (1986, 323) is that for the intellectual elite represented by Han Confucianism—and this includes the creators of the *Seven Epitomes*—genuine axial breakthroughs are most unlikely:

> What would happen is perpetuation of old thinking with meticulous efforts to organize the current knowledge, instead of offering a new angle of speculation and a new dimension of exploration.

Even though Lee (2016) observes the same fusion of Confucianism or Classicism with elements of other schools of thought, the structural differences between preaxial and axial thinking are not taken into consideration. From a cognitive-developmental perspective, it becomes evident

that the intellectual and epistemological foundation of the *Seven Epitomes* is derived from an intellectual milieu in which the prevalent way of thinking falls back behind a level that the axial transformations once achieved in China a few centuries earlier (cp. Roetz 1993). This helps to understand why correlative thinking is the most characteristic feature of the catalog of the imperial library, even though more advanced forms of reasoning can be found in older writings.

By taking axial transformations as points of reference, the comparison of long-term developments in Chinese and Western intellectual history shows some striking parallels. As pointed out by Graham (1989), one can find different levels of thinking, that is, correlative thinking and causal or analytic thinking, in both China and the West. According to him, the uniqueness of correlative thinking, as expressed in theories of Ying Yang or Five Phases, for example, has nothing to do with being Chinese but can also be found in the West, as manifested in Pythagorean numerology, Galen's doctrine of Four Elements and Four Humors, and later in the writings of Hermes Trismegistus, Albertus Magnus, and even Johannes Kepler. This view is supported by Benjamin I. Schwartz (1985, 350) who describes the Chinese "correlative cosmology" or, more precisely, "correlative anthropocosmology," in which phenomena of the human world correspond to phenomena of the natural world, not at all as a culture-specific way of thinking but, with reference to Claude Levi-Strauss's "science of the concrete," as the dominant mode of thought in most indigenous or preliterate societies. Even in literate societies, as Schwartz (1985) with reference to Joseph Needham emphasizes, the microcosm/macrocosm doctrine can be found, not only in ancient China but also in medieval and Renaissance Europe (see also Foucault 1970; Gurevich 1985; Dinzelbacher 2006). This cross-cultural phenomenon of the microcosm/macrocosm doctrine is something that Habermas would describe in developmental terms as an early stage in the differentiation of validity spheres, in which the social world and the natural world are still fused and considered holistically (see Appendix C: Table C.13).

In other words, both the Chinese tradition and the Western tradition show dynamic changes in intellectual history in that sometimes correlative thinking and sometimes analytic thinking is prevalent, depending on the particular sociohistorical contexts. On one hand, Graham (1989) observes that both traditions show occasional episodes in which analytic thinking temporarily replaces correlative thinking but without significant resonance or institutionalization in the broader society (e.g., Mohist school in China; Archimedes, Grosseteste, and Roger Bacon in the West). On the other hand, Jose Casanova (2012, 210) notes that both traditions also show regressive trends or "archaic resacralizations," such as Greek culture in Hellenism or Confucian thought in the Han dynasty, the latter termed as "sacro-magical religio-political imperial cult."

A further prominent example of cognitive regression in collective development within the Western tradition is the beginning of the Middle Ages after the so-called barbaric invasion, characterized by a decline of social complexity, technological infrastructure, and educational institutions (Radding 1978; 1985; Roetz 1993; Dinzelbacher 2006; Habermas 2019). Barnes (2000) states that from the sixth to the tenth century in Europe the archaic level of cognition, which he relates to preaxial or preoperational thinking, reappears more strongly than centuries before. In a similar way, historian of mentality Peter Dinzelbacher (2006) notes that early medieval thinking presents a decline of the ability to abstraction and of intellectual flexibility, while the relatively closed worldview is dominated by religion, dogmatic authorities, and associative, image-based thinking.

If the intellectual milieus in medieval Europe and ancient China are indeed dominated by the same levels of knowing, one should expect some significant structural similarities between the ancient Chinese *Seven Epitomes* and early medieval European library catalogs. In fact, library historian Buford Scrivner (1980) offers some hints that seem to support this view. Scrivner (1980) analyzes four monastic library catalogs of the ninth and tenth centuries, namely, the catalogs of the monasteries of Reichenau (822), St. Riquier (831), St. Gall (9th century), and Bobbio (10th

century). These exemplary library catalogs are regarded as typical of monastic institutions in general and examined as cultural artifacts closely related to the intellectual milieu of the time and as an expression of the needs and values of the users of the libraries. Up to the late Middle Ages, monastic library catalogs are essentially inventories and neither designed as finding tools nor developed with a full classification scheme. Nevertheless, principles of organization can be identified, such as the use of headings or main classes for author, subject, and form. One of the most significant characteristics, according to Scrivner (1980, 440), is that fields of knowledge are distinguished and disposed into a hierarchical structure in the sense of a "valuative hierarchy of forms of knowledge" (see Table 5.12).

Table 5.12 Valuative hierarchy of the library catalog of the monastery of Reichenau (822).

Catalog	Reconstructed valuative hierarchy
De libris Veteris ac N. Testamentari (Books of the Old and New Testaments)	Scriptures: Divine revelation
De opusculis S. Augustini (Works of St. Augustine) *De opusculis B. Hieronymi* (Works of St. Jerome) There follow six headings of identical form introducing works by Gregory the Great, Leo I., Cyprian, Eusebius (his church history), Hilary, Basil, and Athanasius. *De vita patrum* (Chiefly lives of the church fathers, but also accounts of the destruction of Troy, *Appollonius of Tyre*, and a book on architecture. *De libris Iosephi* (Josephus's history of the Jews) Law (Civil, Roman, and Germanic codes) History and Geography (Secular history only) Medicine Service books (Lectionaries, psalters, and antiphonaries) *De opusculis S. Ambrosi* (Works of St. Ambrose) There follow author heading for the works of John Chrysostom, Orosius, Cassian, Eucherius, Prosper (prose works only), Isidore of Seville, Bede, Cassiodorus, Primasius, Aldhelm (both poetry and prose), and Boethius. *De libris canonum* (Canon law) *De libris homilarium* (Collections of homilies, one noted as being arranged according to the calendar of church holidays) *De regulis* (Monastic rules of Benedict and others) *De passionibus sanctorum* (Hagiography) *De libris glossarum* (Miscellanies of writings by "diversis doctoribus")	Church fathers: Interpretation revealing moral and anagogical levels of meaning
De libris Prisciani Grammar and rhetoric (Priscian, Donatus, and others) Poetry Christian (Juvencus, Sedulius, Prosper, Aldhelm, and others) Pagan (The *Georgics* and portions of the *Aeneid* of Virgil)	Grammar and rhetoric texts, poetic works: Language study, access to literal level

Source: Based on Scrivner (1980, 429: Table 1).

The example of the monastery of Reichenau can illustrate some typical characteristics of monastic library catalogs of the time. Like the *Seven Epitomes*, the Reichenau catalog is arranged as an order of importance or value ranking. The Holy Scriptures—generally referred to as

"*bibliotheca*" (Jackson 1967, 193 [emphasis in original])—are related to divine revelation and enjoy a place of honor at the top, followed by the so-called church fathers as the most important interpreters of the biblical writings and further approaches to their study and understanding, while grammatical and rhetorical texts grouped with poetical works are placed at the end of the catalog and valued less because they are concerned with linguistic studies that offer access only to the literal meaning of the Scriptures.

Also like the *Seven Epitomes*, the organization is not especially rigorous since the conflicting interests of headings for author, subject, and form find varying solutions and tend to overlap to some extent. For example, the subject heading *De vita patrium* includes not only works on the lives of the church fathers but also works on the pagan hero Appollonius of Tyre, on the Trojan War, and on architecture. As Scrivner (1980) suggests, the true subject of this heading should rather be seen as History in a broad sense. Among the church fathers, Augustine is listed first because he is considered to be the most important authority (cp. Jackson 1967), similar to the treatment of Confucius in the *Seven Epitomes*. Sometimes particular texts are separated from the group to which they actually belong and placed higher in the value ranking "out of reverence for their ages and association with saints" (Scrivner 1980, 434), strikingly similar to the principles of the *Seven Epitomes* that Lee (2016, 136, 182) calls the "Classicist temporal principle" and the "Classicist moral ladder."

A further example for groupings that are not mutual exclusive is presented by the author heading *De libris Prisciani* that not only includes works of Priscian, the authority regarding Latin grammar, but also works of other authors that are either concerned with the same subject (i.e., grammar and rhetoric) or written in the same form (i.e., verse instead of prose). As the case of Prosper indicates, this means that not all works of an author are listed under the respective author heading but that, for example, poetical works are separated due to its form and listed under the subheading of Poetry. Interestingly, the subdivision of Poetry into higher valued

Christian texts followed by pagan texts shows a quite similar value dichotomy as typically underlies the *Seven Epitomes*.

According to Scrivner (1980, 436), the relative location of grammar and rhetoric texts combined with poetical works under the same heading and near the end of the catalog can be found in all four monastic libraries and presents one of "two major recurrent patterns of association." This first one goes back to the classical ancient tradition of the seven liberal arts (*septem artes liberales*), divided into the elementary Trivium (i.e., grammar, rhetoric, dialectic) and the advanced Quadrivium (i.e., arithmetic, geometry, astronomy, music). The liberal arts, as opposed to the lesser valued mechanical arts concerned with useful or practical knowledge, are considered to be studies that lead to moral and intellectual excellence. This is another similarity to the *Seven Epitomes* and its implicit Way/vessel dichotomy that separates philosophical from technical writings and connects all branches of knowledge to an overarching unity. As noted by philosopher James A. Weisheipl (1965, 89), the Greco-Roman heritage of the liberal arts education is an indispensable foundation for the study of philosophy or Christian theology in the Middle Ages and its underlying classification of sciences typically presents an ascending hierarchy in which each science is "resolved into a higher and more universal science."

The second pattern of association identified by Scrivner (1980) in relation to monastic library catalogs is that service books form large clusters with works concerned in various ways either with law (e.g., civil law, canon law, monastic rules) or with time (e.g., history, the computation of time, the observance of time through liturgy). For Scrivner (1980), this can be explained by taking the user groups of these libraries into account and their routine of life in the monastery that is highly regulated by monastic rules, liturgical hours, and the Christian calendar. As Scrivner (1980, 443) concludes, such patterns of association can be related to the underlying worldview, in this case to the worldview of Christianism in medieval Europe:

> That the associative type of organization was possibly less a result of conscious attempts at imposing order than an unforced expression of world view perhaps argues against its being admitted as cataloging in the strict sense of the term, something constructed *kata logos*, or 'according to reason.'

Without speculating whether the organization of the *Seven Epitomes* is the result of conscious attempts, as Lee's (2016, 36) "intellectual activism" claims, or an unforced expression of an unreflected worldview, the structural similarities between ancient Chinese and medieval European bibliographic classification and cataloging should have become obvious. Both of them show the characteristics of complexive classification based on correlative thinking.

Finally, the comparison of the Chinese and Western traditions should not be restricted to examples of correlative thinking but also include those of analytic thinking. As noted by Lee (2012a, 379), since the early 20th century Chinese bibliographic classifications are commonly modeled on Western-style counterparts, following the "same analytic approach to knowledge organization." According to Lee (2012b, 63), this is the result of a "dramatic westernization." But as Yu Keping (2008) emphasizes, learning from the West does not necessarily mean westernization but should rather be considered to be a part of the process of modernization in which the own cultural identity can keep its autonomy from Western hegemony.

In the following, it will be argued that the development of analytic thinking in China is closely related to long-term processes of rationalization that begin with the axial transformations in ancient times and find their full expression in the 20th century, a time highly influenced by the world-wide trends of modernization and globalization. As a corollary, the modern analytic approach to classification in China should not simply be regarded as an effect of cultural imperialism but rather as a result of rational insight that gives Chinese classificationists and catalogers convincing reasons for its adoption in order to cope with new challenges.

As Hajime Nakamura (1975, 476) emphasizes, there is a "gradual indigenous development of 'modern' conceptions," corresponding to, although different from those in the West. This includes the already mentioned axial transformations in ancient China, most importantly, the tradition of the Mohist school and its invention of logical principles. According to Harbsmeier's *Logic and Language*, the Mohist definition of *reason* (*ku*) comes very close to Western conceptions and is alien to the prevalent analogical reasoning or correlative thinking in contemporary China, while the syllogisms by first-century philosopher Wang Chung are more Aristotelian than the standard medieval Western form (Kim 1999).

Nevertheless, as emphasized by Graham (1989), there is nothing similar in China to the *scientific revolution* in the West that takes place from the 16th to the 18th century. Although Lee (2012a) with reference to Joseph Needham notes that science and technology in imperial China is by no means underdeveloped compared to the West, Needham's famous question "Why did the 'scientific revolution' not take place in China?" (Kim 1999, 451) points to a significant difference. Here is neither the place to answer this question nor to recapitulate the long-standing debate on the multiple factors and historical conditions that influence the dynamics of development in both cultural traditions. But two aspects seem to be worth noting.

First, a cognitive-developmental perspective suggests that the emergence of modern science is related to advanced levels of knowing that allow hypothetico-deductive reasoning, nomological explanations, and revisable theories based on empirical testing, such as Piaget's transition from concrete-operational to formal-operational cognition (see Appendix B: Tables B.36, B.37, B.46), Barnes's transition from classical or axial thought to empirical-critical thought (see Appendix C: Table C.1), and Habermas's transition from rationalized to reflexive worldview (see Appendix C: Table C.10). These developmental-logical differences are independent of the causal explanations of the mechanism or dynamics of historical change but may at least indicate the important role of cognitive development in the diachronic dimension of cultural traditions.

The second aspect is that the significant difference between China and the West regarding the scientific revolution does not need to be reduced to culture-specific peculiarities. Graham (1989, 320) argues that what cultural essentialism considers as a difference between China and the West should rather be seen as a "transcultural difference between proto-science and science." There is a broad range of other transcultural differences resulting from societal developments like the neolithic or agricultural revolution, the use of bronze, the invention of writing systems, and the axial transformation. In all these cases, structural transformations take place in various and often independent cultural traditions in a similar way, which points to causal explanations that are not culturally specific but rather characteristic for stage transitions in societal development in general. As it is typically the case, the dynamics of development varies from culture to culture, which means that the onset, pace, and effectiveness of these transformations might differ from one context to another and also that not all cultural traditions take part of these processes. In a similar way, the scientific revolution may indicate the emergence of a new developmental stage that takes place first in the West but is by no means limited to this particular cultural tradition. In other words, one should not equate westernization and modernization, as stressed by Nathan Sivin (1990, 167):

> Nevertheless, the transforming influence of the scientific and industrial revolutions was so great that earlier sciences of China and Europe resemble each other more than either resembles the modern variety. It is important, if one is to think clearly about science and technology as worldwide phenomena, to avoid confusing differences between China and the West with differences between traditional societies and societies that have become essentially modern.

This view is supported by Barnes (2000), who states that modern science is not a local enterprise guided by social values or cultural preferences but is based on universal validity claims. After the scientific revolution, as Graham (1989) notes, the explanations of both Chinese and Western

medieval and Renaissance proto-science are not considered to be explanations at all since they stand neither critical reflection nor empirical testing—a further example of Habermas's devaluative shifts.

Therefore, Ken Baskin and Dmitri M. Bondarenko (2014, 2) take up Jaspers's idea to consider modernity as a "second axial age," and thus modernization as a transcultural process. In this regard, the debate on Eisenstadt's (2000, 1) notion of "multiple modernities" also shows the need to emphasize the variety of ways this process can take (see also Sachsenmaier and Riedel 2002; Thomassen 2010). For example, Nakamura (1985) identifies different accents that cultural traditions place on particular world relations, for example, on the natural world in the West, on the subjective world in India, and on the social world in China—something that Habermas's (1984, 240) would call a "selective pattern of rationalization." Nevertheless, modernization is essentially a transcultural process of rationalization.

Admittedly, the process of modernization in China is closely related to external influences from the West, particularly, between the 17th and 19th century, in which Jesuits spread not only new religious ideas but also the principles of European logic and geometric models that, at least in certain fields like astronomy, are enthusiastically recognized by Chinese scholars (Sivin 1995; Kurtz 2001). Interestingly, the 19th century is also the time in which the ancient writings of the Mohist school, unread and forgotten in Han times, are rediscovered and newly edited (Lloyd and Sivin 2002). Finally, in the early 20th century a "strikingly rapid naturalization of the alien notion of logic in Chinese discourse" (Kurtz 2001, 149) takes place and logic establishes itself as an academic field. As Wang Hui (2008) states, the main characteristic of Chinese thought in the 20th century is the extensive application of the concept of *science* that serves as a symbol of liberation. Wang Hui (2008, 132) even speaks of an "enlightenment movement" in which the traditional worldview based on heavenly principles is replaced by a scientific worldview based on axiomatic principles, even though the former may still exist as an element within the latter.

Unsurprisingly, this new scientific interest of mainstream intellectuals also leads to new forms of a "rationalized classification of knowledge" (Wang 2008, 125).

The influence of Western culture, often described as an imperialist intrusion or cultural invasion, and the increasing amount of foreign books challenge the traditional Chinese bibliographic classification (Tsien 1952; Huan Wen 1991; Yi and Jin 1996). These traditional classifications are deeply influenced by the *Seven Epitomes* that functions as a model for many four-fold classifications divided into Classics, History, Philosophy, and Belle-lettres, such as the *Bibliographical Classification of the Four Branches of Literature* (1793) (Tsien 1952; Jiang 2007; Lee 2016). As summarized by Hong Yi and Zhan Jin (1996), these traditional classifications are not adequate for Western books and the whole field of modern knowledge, their lack of numbering is not effective for shelving and organizing bibliography, and their reliance on a particular library collection hinders independence, compatibility, and availability. Therefore, at the end of the Qing dynasty the *Dewey Decimal Classification* begins to function as the new role model and soon dominates Chinese bibliographic classification and cataloging (Huan Wen 1991; Yi and Jin 1996). According to Hong Yi and Zhan Jin (1996), Chinese classificationists and catalogers create more than 20 different decimal classifications modeled on the DDC, such as the *Chinese Classification of Books* (1929), representing a shift from collection-based classification to science-based classification including a scientific notation system (see Table 5.13).

Table 5.13 Comparison of traditional and DDC-influenced Chinese library classifications.

	BCFBL (1793) *Bibliographical Classification of the Four Branches of Literature*	DDC (1876)* *Dewey Decimal Classification*	CCB (1929) *Chinese Classification of Books*
Basic classes	Confucian	000 General	000 General
	Classics	100 Philosophy	100 Philosophy
	History	200 Religion	200 Religion
	Philosophy	300 Social Sciences	300 Natural Science
	Belle Lettre	400 Linguistics	400 Applied Science
		500 Natural Sciences	500 Social Science
		600 Applied Sciences	600/700 History and Geography**
		700 Art	
		800 Literature	800 Language and Literature
		900 History and Geography	900 Art
Notation system	*none*	Pure notation with Arab numerals Decimal hierarchical	Pure notation with Arab numerals Decimal hierarchical
Major structure	A main table	A main table 7 common auxiliary tables An index A handbook	A main table 8 common auxiliary tables 2 special auxiliary tables
Compiling technique		Double-table listing The usage of "0"	Multiple listing Offering reserved classes

Source: Based on Yi and Jin (1996, 214).

* The DDC scheme presented by the authors is taken from the 20th edition published in 1989.

** In the original table, there is no main class 700. But as noted by Tsien (1952), the main classes 600 and 700 are combined by the creator of the CCB.

As the example of the *Chinese Classification of Books* (1929) demonstrates, what is adopted from the DDC is first and foremost the decimal principle with its logical structure and hierarchical force combined with the notation based on Arab numerals including the usage of the zero power. But there are also some significant modifications in order to adapt to the Chinese context, for

example, some main classes and many subclasses are modified or merged together, and empty classes of the original DDC are often used for additional classes covering traditional Chinese topics (Tsien 1952; Liu-Lengyel 1987; Huan Wen 1991). Parallel adaptations to sociocultural contexts and needs also take place in other East Asian countries like Korea and Japan (Oh 2012; Choi 2017). These context-aware adaptation processes, as well as the fact that many Chinese librarians even study library science in the US in order to improve Chinese library theory and practice (Huan Wen 1991), indicate that the Western model is not simply adopted blindly but based on rational insights. Only these features or principles are adopted that appear to be most promising to cope with the new challenges, while others are neglected or modified. These features and principles, in turn, are essentially those that are characteristic of taxonomic classification based on analytic thinking.

These considerations allow to conclude that the turning point in Chinese library history from an orientation on the *Seven Epitomes* towards an orientation on the *Dewey Decimal Classification* should not be described solely in terms of westernization but rather in terms of modernization and rationalization, as suggested by Tsuen-Hsuin Tsien's (1952, 323) distinction between the epochs of "classical classification" and "modern classification." The proposed cognitive-developmental approach shows that these two major approaches to classification can be related to distinct developmental stages of classificatory cognition that are potentially available for human beings in general. In many respects, the *Seven Epitomes* presents culture-specifically "the Chinese way" (Lee 2010b, 1) to knowledge organization while the *Dewey Decimal Classification* presents the Western way. But a significant result of this case study is that according to the underlying depth structures both of them should rather be described in transcultural terms, that is, either as the correlative way or the analytic way to knowledge organization.

5.3 Summary

The case study on the ancient Chinese library classification *Seven Epitomes* demonstrates a methodological contribution of the cognitive-developmental approach to knowledge organization. The premise that knowledge organization systems, in general, are by no means neutral representations of reality but culturally and historically embedded human artifacts that serve a given purpose is shared with the prevailing context-aware approaches of domain analysis, such as Hur-Li Lee's socio-epistemological approach to the *Seven Epitomes*. But the socio-epistemological approach that explicitly adopts a *cultural perspective* is merely concerned with the unique characteristics of a given epistemic context and does not consider structural similarities and implicational universals across contexts. The cognitive-developmental approach takes a *cross-cultural* or *transcultural perspective* and offers an analytic framework for a comparison of different cultural and historical contexts, exemplified in this case study by a comparison of the *Seven Epitomes* and the *Dewey Decimal Classification*.

The main finding is that Lee's distinction between correlative and analytic approaches to knowledge organization can neither be derived from cultural differences between China and the West nor from historical differences between ancient and modern times but needs to be described in transcultural terms, that is, against the background of the context-independent developmental logic of human cognition. Accordingly, correlative and analytic thinking present different deep structures or stages along one and the same developmental sequence. Thus, the epistemic pluralism presented by the multiplicity of cultural and historical contexts can be organized according to both structural similarities and structural differences related within a developmental continuum. In other words, the organizing principle of Integrative Levels of Knowing offers a broader view to see the big picture, or, to invoke the metaphor from the introduction, the daylight for the blind men who investigate an elephant.

6 CASE STUDY II: THE INTERDISCIPLINARY *INTEGRATIVE LEVELS CLASSIFICATION*

6.1 Context Representation in the *Integrative Levels Classification*

6.1.1 The Phenomenon-Based Facet-Analytical Approach

While the first case study is concerned with the analytical dimension of *knowledge organization in context* or the information professionals's frames of reference (context of mediation), this second case study is concerned with the analytical dimension of *context in knowledge organization* or the representation of epistemic contexts or authorial perspectives of documents (context of production) in a specific knowledge organization system. The overarching goal is to demonstrate exemplarily the contribution of the proposed cognitive-developmental approach to knowledge organization, which can be considered to be a methodological extension to the so-called phenomenon-based facet-analytical approach in that is offers two novel organizing principles for a classification of epistemic contexts. The phenomenon-based facet-analytical approach to knowledge organization presents one of the most elaborate endeavors to an explicit context representation in terms of authorial perspectives in KOSs. But in its current state it seems to be mainly concerned with a differentiation of epistemic contexts, as they can be derived inductively from the documents or from academic discourses. This often results in a kind of term lists of different but largely unstructured epistemic contexts or perspectives.

Departing from this point, the cognitive-developmental approach is primarily interested in a systematic organization of epistemic contexts in terms of collocation and subordination. This systematic interest aiming to establish a documentary language that goes beyond the expressiveness of term lists requires additional methodological tools to analyze and interrelate the often only implicit authorial perspectives of documents, that is, the underlying rule systems or generative structures according to which these documents are brought forth. It will be shown to what extent the cognitive-developmental approach can provide such tools by taking recourse

to Jürgen Habermas's (1984; 1987) *Theory of Communicative Action* and Ken Wilber's (2000) AQAL framework, as described in Chapter Three. The decisive contribution for context representation is to offer two novel organizing principles, namely, the Integral Methodological Pluralism (IMP) for a basic classification of methods and the Integrative Levels of Knowing (ILK) for a basic classification of viewpoints.

The object under investigation is the interdisciplinary knowledge organization system *Integrative Levels Classification* (ISKO Italia 2004). One reason for this choice is that the ILC, as a current research project under the lead of Claudio Gnoli, presents one of the most ambitious and most elaborate attempts of context representation in KOSs while it explicitly discusses its underlying theoretical and methodological assumptions (ISKO Italia 2004; Szostak, Gnoli, and López-Huertas 2016; Gnoli 2020a; 2020b; Park, Gnoli, and Morelli 2020). Another reason is that the ILC, as an experimental KOS testing innovative features, seems to be open in principle for a future application of the proposed new principles of organization. This appears to be particularly promising since the ILC's basic structure is already based on the organizing principle of integrative levels and thus provides a point of departure for a complementary application of the organizing principle of Integrative Levels of Knowing.

As an initial orientation, this section describes the *Integrative Levels Classification* according to Gnoli's (2016, 3) "phenomenon-based facet-analytical approach." The next section discusses some limitations of its underlying methodology in its current state and outlines the potential contribution of the cognitive-developmental approach. Finally, the remainder of this case study introduces the organizing principles IMP and ILK and explores possibilities of a future application to the *Integrative Levels Classification*.

The *Integrative Levels Classification*, developed since 2004 and published online as first edition in 2011 (ISKO Italia 2011), is a knowledge organization system that is intended to be general in scope in order to cover all areas of knowledge and "to enable interdisciplinary and

intercultural communication" (Gnoli 2020b, 40) in that it allows to express multiple perspectives and a broad spectrum of contextual relations regarding the knowledge represented in documents. In opposition to domain-specific KOSs that seek to adopt the particular view of a more or less demarcated epistemic community to support the specific information needs of users in that domain, the general approach of the ILC seeks to establish a documentary language that supports "conceptual interoperability" (Gnoli 2020b, 40) by representing as many perspectives as possible to allow users to shift from one domain-specific view to another. As pointed out by Gnoli (2020b, 38), "KOSs should enable their users to represent the different cultural perspectives of documents and their authors, not just a dominant one."

For that reason, the basic structure of the ILC is not based on disciplines or fields of knowledge, as is the case for many traditional library classifications with a general scope (e.g., DDC, UDC, LCC, CC), but on phenomena as the actual objects or things that are studied from various disciplinary perspective or, more generally, within various epistemic contexts. These phenomena as basic units cannot only be related to other phenomena but to a variety of context information, such as the underlying theoretical and methodological approaches investigating these phenomena (Szostak and Gnoli 2008). For the representation of such context information, the ILC uses the analytico-synthetic technique of faceted classification, as known, for example, from Ranganathan's *Colon Classification* but shows also some innovative features. For a better understanding of the ILC, its core structural components will be considered in more detail, as defined by Gnoli (2016; 2017a; 2017b; 2018) in terms of dimensions, types and levels, facets, as well as themes and rhemes. Unless indicated otherwise, this study refers to the second edition of the *Integrative Levels Classification* (ISKO Italia 2019) as the latest stable online version containing 10,851 classes and facets (Park, Gnoli, and Morelli 2020).

The first structural component, the *dimensions*, refers to the kind of metadata that are provided by classification notations, which is why it is sometimes also called "metadata

dimensions" (Gnoli 2011, 272). The ILC distinguishes seven dimensions that are indicated by Greek lower-case letters (see Table 6.1).

Table 6.1 Dimensions of the *Integrative Levels Classification* (2nd edition).

Dimension of knowledge organization		Corresponding field
α	reality in itself	mysticism
β	phenomena	ontology
γ	perspectives	epistemology
δ	documents	bibliography, epigraphy, etc.
ε	collections	library, archive and museum science
ζ	information needs	cognitive and information science
η	people	sociology

Source: Based on Gnoli (2016, 406: Table 1).

While the α dimension is considered to have little significance for knowledge organization because reality in itself is inaccessible and human knowledge about reality is always experienced indirectly through sense organs and the central nervous system, the most important dimensions are considered to be those related to phenomena, perspectives, and documents (Gnoli 2016).

The β dimension refers to phenomena as "the most universal knowledge units, on which an analytico-synthetic KOS should be based" (Gnoli 2012, 273). The underlying concept of phenomenon follows Immanuel Kant's distinction between *noumena* as the unknowable thing-in-itself (*Ding an sich*) and *phenomenon* as any object of the senses (cp. Ridi 2016). Nevertheless, this concept is not related to any school of phenomenology but used in a broad sense that allows to consider any object, process, or relation to be a phenomenon, including the perspectives, documents, collections, information needs, and people treated within the other metadata dimensions (Gnoli 2016). The main advantage of such a phenomenon-based approach compared to a traditional discipline-based approach to knowledge organization is seen in its advanced

expressiveness or "representational power" (Gnoli 2016, 412). Since literally everything can be treated as phenomenon, everything can be related to everything else. This allows a phenomenon-based KOS to represent even disciplines as a special kind of phenomena and, therefore, to "mimic the logic of classmarks in a common disciplinary classification" (Gnoli 2016, 412), while the opposite seems to be impossible since a phenomenon cannot be treated as a special kind of discipline. As outlined in Chapter Three, there are other challenges of discipline-based KOSs like currency, hospitality, and cross-classification, as identified by the Classification Research Group (CRG 1969). The ILC project places itself in the tradition that considers phenomena as the most basic and most important units of a KOS with a general scope, as exemplified not only by the CRG's general scheme but also by Brown's *Subject Classification*, Scheele's *Universal Facet Classification*, Shpackov's *Universal Classification*, and Szostak's *Basic Concept Classification*, among others (Gnoli 2016). This priority of phenomena over disciplines or perspectives in general is grounded in a metatheory that prioritizes ontology over epistemology (Gnoli and Poli 2004). While Gnoli (2011) agrees that human knowledge consists of both ontological and epistemological components since complete neutrality in the process of knowing appears to be utopian, he argues that the ontological foundation of knowledge organization should be "as culturally neutral and as generally agreed as possible" (Gnoli 2008b, 140). Accordingly, the basic structure of a phenomenon-based KOS like the ILC should aim to be an intendedly neutral "general reference scheme" (Gnoli 2011, 98). In fact, the name of the first draft is *Naturalistic Classification* in order to indicate this ontological orientation on the structures of reality, before its renaming in *Integrative Levels Classification* to avoid the suggestion of a limitation to natural sciences (ISKO Italia 2004).

The γ dimension refers to perspectives in a broad sense as ways of looking at or approaching phenomena that determine the subject matter or aboutness of documents. This includes established concepts from KO discourse, such as Szostak's theories and methods,

Hjørland's and Albrechtsen's domains, Svenonius's aspects, Beghtol's viewpoints, and Vickery's activities (Gnoli 2016). The following list of different kinds of perspectives is provided by Gnoli (2016, 407) as particular relevant for context representation in KOSs:

- communicative function, e.g. report, operational instruction, advertisement
- discipline, field of study, e.g. physics, engineering, architecture
- domain of discourse, community, e.g. astronomers, sport fans
- cultural context, viewpoint, e.g. modern Western, indigenous
- activity field, e.g. cultivation, healing, education
- theory, e.g. evolutionism, creationism
- method, e.g. laboratory testing, interviews
- locus of knowledge, e.g. China, Africa
- epoch of knowledge, e.g. Medieval, contemporary

For this study, the perspective dimension is by far the most important one. Since the ILC treats such perspectives as particular facet categories with numerous subcategories, these will be outlined below in more detail.

The δ dimension refers to documents as physical or digital artifacts with all their features that are relevant for bibliographic records and descriptive indexing, such as title, name of author or producer, publisher, format, language, material, size, duration, and so on. As emphasized by Gnoli (2016), the document dimension should not be limited to libraries and the LIS field but also encompass documents organized in museums, galleries, archives, and other memory institutions. Taking this broader perspective into account, the ILC also defines the ε dimension referring to whole collections of documents, in which metadata offer information, for example, about storage, management, and access to collection. Furthermore, the ζ dimension refers to information needs that may vary in different contexts and for different purposes, such as information needs for school, job, leisure, or a dissertation project. And Finally, the η dimension refers to people and is concerned with metadata like age, gender, education, wealth, and so on.

According to Gnoli (2012), these metadata dimensions are often mixed up or lumped together in knowledge organization practice and he argues that they should be treated separately.

The second structural component, the *types and levels*, represents the organizing principles of the basic structure of the ILC, most importantly, the order of main classes and their relation to subsequent subclasses. Both types and levels constitute hierarchical relations which are the distinctive features of a classification system compared to term lists. In mathematical terms, as Gnoli (2017a) writes, hierarchical relations present ordered sets in which all elements or classes as basic units are ordered within a linear sequence and a prescribed position compared to other classes. This is what qualifies a classification system to be a systematic order in contrast, for example, to an alphabetical order of term lists (Gnoli 2020b). According to Gnoli (2017a), *types* refer to the hierarchical relation of inclusion and form chains of classes, while *levels* refer to the hierarchical relation of dependence and form arrays or levels of classes. As discussed in Chapter Three, "inclusion relationships" (Gnoli 2017a, 44) are well-known as genus-species relations defined by the inheritance of features from the superordinate class to the subordinate class (e.g., organisms—animals—mollusca). By contrast, the "dependence relationship" (Gnoli 2017a, 44) means that the existence of a given class of phenomena depends logically and chronologically on the existence of other classes of phenomena. Therefore, classes of newer or higher-level phenomena should be listed after classes of older or lower-level phenomena on which they depend, resulting in a sequence of evolutionary order of appearance or emergence (e.g., organisms—consciousness—artworks). At this point, the ILC project takes recourse to the theory of integrative levels and the notion of "level of organization" (Gnoli 2017a, 40) that combines explicitly Ranganathan's principles of later-in-time, later-in-evolution, and increasing complexity. The sequence of main classes of the ILC, indicated by Latin lower-case letters, is arranged according to such levels or arrays of classes based on dependence relations (see Table 6.2):

Table 6.2 Main classes of the *Integrative Levels Classification* (2nd edition).

Main classes			
a	forms	n	populations
b	spacetime	o	instincts
c	branes	p	consciousness
d	energy, wave-particles	q	language
e	atoms	r	rituals
f	molecules	s	communities
g	continuum bodies	t	polities
h	celestial bodies	u	enterprises
i	rocks	v	technologies
j	land	w	artifacts
k	genes	x	artworks
l	bacteria, prokaryotes	y	knowledge
m	organisms (eukaryotes)		

Source: Based on Park, Gnoli and Morelli (2020, 40).

The main classes of the ILC present differentiations of Nicolai Hartmann's sequence of six major levels of reality (i.e., forms, matter, life, mind, society, and culture), limited to the number of letters in the Latin alphabet (Gnoli 2017a). Note that the missing letter `z`, occupied in the first edition with the main class `religion` that is now integrated in `r rituals` (ISKO Italia 2011), functions in the second edition only as expanding notation for other classes, called "emptying digit" (Park, Gnoli, and Morelli 2020, 41). For reasons of better readability, classification notations of the ILC and its verbal meaning will be set in a different font (cp. ISKO Italia 2004).

While each main class can be divided into a free number of subclasses in the sense of *types* based on inclusion relations, the order of the resulting sibling classes can be arranged in the sense of *levels* based on dependence relations, at least where it seems to be appropriate (Gnoli 2017a). In the following example excerpted from the ILC, subclasses are indicated by an

additional Latin lower-case letter for each subdivision, while the alphabetical order of sibling classes indicates the increasing levels of organization (cp. Gnoli 2017a):

```
m          organisms
   mn         fungi
   mp         plants
   mq         animals
      mqe        flatworms
      mqm        mollusca
      mqv        chordates
```

This excerpt shows how the classification notation can provide information about both the structure or morphology and the origin or phylogeny of phenomena. On one hand, the *mq-* part of the notations means that `flatworms`, `mollusca`, and `chordates` share sufficient morphological features to identify them as different types of `animals` in contrast to `fungi` or `plants`, which in turn share sufficient morphological features with `animals` to identify all of them as types of `organisms`. On the other hand, the alphabetical order of the `--e`, `--m`, `--v` parts of the notations indicates that these sibling classes as different types of `animals` present a phylogenetic or evolutionary order, just like the sequence of `-n fungi`, `-p plants`, and `-q animals`. Note that the letter `-a` is always reserved to express attributes of a class (e.g., processes, properties and parts), which is why genuine subclasses begin with the letter `-b` (Gnoli 2020a). Important for this study, types and levels can also be used to classify phenomena of consciousness or cognition, which offers an important point of departure for an application of the organizing principle of Integrative Levels of Knowing. In fact, the ILC already entails, with explicit reference to Kleineberg (2018) in a scope note, a first attempt to represent levels of moral consciousness according to Kohlberg's developmental stages:

```
p          consciousness
   pc         perception
```

```
pe          emotion
po          cognition
   pod         attention
   poe         memory
   pou         moral consciousness
      poud        punishment and obedience orientation
      poug        instrumental exchange
      pouj        pleasing expectations
      poum        law and order orientation
      poup        youthful protest
      pous        utilitarian orientation
      pouv        universal ethical principle orientation
```

However, this excerpt of classification notations refers exclusively to the β dimension of phenomena, which means that Integrative Levels of Knowing like Kohlberg's stages of moral consciousness are treated first and foremost as the subject matter or aboutness of a document, as it would be the case for books on moral development. But to treat them as genuine context information related to the γ dimension of perspectives like an author's moral view, a further component of the ILC needs to be introduced.

The third structural component, the *facets*, refers to categories that represent attributes of a given phenomenon like properties or relationships. In online environments like OPACs, resource discovery systems and product search engines, facets may function as search filter but are often limited to the δ dimension of documents and descriptive metadata like date, size, and language (Gnoli 2012). But the original notion of facets developed by the tradition of library classification initiated by Ranganathan (1989; 1992) refers to more substantive facets in relation to both the β dimension of phenomena and the γ dimension of perspectives. Gnoli (2017b) provides examples of facets as fundamental categories applied in KOSs that include Ranganathan's famous PMEST formula (Personality, Matter, Energy, Space, Time), Bhattacharyya's DEPA formula (Discipline, Entity, Property, Action), Giunchiglia's DERA formula

(Domain, Entity, Relation, Attribute), and Vickery's extension of the CRG's faceted general scheme (i.e., thing, part, system, attribute, patient, relation and interaction, operation, agent, place and condition, time). Following this tradition, the ILC defines ten fundamental categories as facets, indicated by single digits. As an innovative feature, these facets can even be divided into subcategories by adding further digits to the notation, as illustrated in Table 6.3 for the facet of perspective:

Table 6.3 Facets of the *Integrative Levels Classification* (2nd edition).

Fundamental categories		Subcategories of the perspective facet	
0	as for, relating to *perspective, aspect, bias, viewpoint, phase relationship, dimension y*	0	as for, relating to *perspective, aspect, bias, viewpoint, phase relationship, dimension y*
1	at *time*	01	as known in *epoch*
2	in *place*	02	as known in *locus*
3	by *agent*	03	as studied by *method*
4	affected by *disorder*	04	subjected to *difficulty, aporia, critics*
5	with *transformation*	05	applied to *activity field, sphere, domain*
6	having *property*	06	according to *theory*
7	with *part*	07	studied in *discipline, field*
8	as *form*	08	illustrated by *story, modality*
9	of *kind*	09	conveying *communicative function, mood*

Source: Excerpted from ISKO Italia (2019).

The idea of facets in the ILC is that they can be related to any other class of phenomena, which is why the ILC is called a freely-faceted KOS in contrast to bound faceted classifications like CC or BC2, in which facets are usually defined only in context to a given discipline (Gnoli 2017b). Within the classification notation, the facet usually follows the class of phenomena, for example, `mq07` means `mq animals 07 studied in discipline, field`. Besides such free or *common facets* expressing a general meaning across the whole classification scheme, the ILC also provides some *special facets*, indicated by subcategories of `9 of kind`, that are defined locally to a given main

class and its subclasses. For example, the special facet *99* for the main class *m* organisms is defined as *m99* organisms with sex, gender, whereas the same special facet *99* for the main class *e* atoms is defined as *e99* atomic number (Gnoli 2017b). Thus, special facets have only local meaning and would be inappropriate for any other main class. Moreover, facets as categories can take different values or foci. For example, a facet like *season* could take the four values of winter, spring, summer, and autumn. Such values or foci can be any kind of phenomena and present either *extra-defined foci* that can be taken from other already existing parts of the classification scheme or *context-defined foci* that need to be established locally for a given facet (Gnoli 2017b). In general, ILC notations can consist of free combinations of classes with other classes, facets, and foci, while the citation order starts with the most important or significant element. The simplest way to combine different phenomena, keeping in mind that in the ILC everything can be considered to be a phenomenon, is to express an unqualified relationship or association indicated by a blank space between each element. For example, the notation *mq k u* represents documents about the main topic *mq* animals in some relation to the phenomena of *k* genes and *u* enterprises. A more qualified expression of relationships is offered by the combination of classes with facets and foci, the latter indicated by letters following digits. For example, the notation *mq0k05u* means *mq* animals *0* as for perspective, aspect *k* genes *05* applied to activity field, sphere, or domain *u* enterprises. Using this analytico-synthetic technique that breaks down a subject matter or context feature into its basic elements in order to combine these elements in complex notations, the ILC is able to relate elements within and across metadata dimensions. References within the β dimension of phenomena are made by using blank space (e.g., *mq u* means *mq* animals in some relation to *u* enterprises), while references to the γ dimension of perspectives are made by using the *0* facet or its subcategories (e.g., *mq03* means *mq* animals *03* as studied by method), to the δ dimension of documents by using the *00* facet or its subcategories (e.g., *mq009* means *mq* animals *009* in

document format), to the ε dimension of collections by using the *000* facet or its subcategories (e.g., *mq0009* means *mq* animals *0009* kept in document collections), to the ζ dimension of information needs by using the *0000* facet or its subcategories (e.g., *mq0000* means *mq* animals *0000* relevant to information needs), and to the η dimension of people by using the *00000* facet or its subcategories (e.g., *mq00000* means *mq* animals *00000* relevant to people).

Finally, the fourth structural component, the *themes and rhemes*, refers to the aboutness or the topics of documents and their differentiation according to relevance and pertinence. In the ILC project, a *theme* is defined as a subject in a statement or document (Gnoli 2018a). The notations of a theme consist of basic classes of phenomena with or without facets and foci. Several themes of a single document can be separated by blank space, while the citation order should prioritize the most significant *base theme* by notating it before other *particular themes* (Gnoli 2018a). This allows to cluster and weight documents with similar themes that might be relevant for a given user query. As an innovative feature, the ILC defines a *rheme*, a term borrowed from linguistics, as the comment or new element of information concerning a given theme (Gnoli 2018a). The example provided by Gnoli (2018a, 46) is a research article describing how the diet of wolves in Liguria is affected by the greater or lesser abundance of wild cervids, which would have "diet of wolves in Liguria" as its theme and "is affected by cervids abundance" as its rheme. While traditional subject indexing often only considers the theme part, Gnoli (2018a) argues with reference to Bella H. Weinberg that the rheme part is of particular importance for expert researchers who are usually aware of the existing body of literature concerning a given theme but are in need of additional information to make a relevance decision according to their specialized information needs. In the terminology of information retrieval, although not used by the ILC project, this theme/rheme distinction is closely related to the difference between "topical relevance" and "cognitive relevance" or "pertinence" (Cosijn and Ingwersen 2000, 537), in which the latter also depends on the current state of knowledge of a

user. According to Gnoli (2018a), the expression of rhemes is often related to the linguistic function called deixis, that is, a reference to an actual object in context rather than an abstract class of phenomena. Depending on these contexts, deictic words (e.g., here, now, tomorrow, there, those, later) may vary in their pointing meaning but can help to qualify a rheme. The ILC provides some special classes, indicated by Latin upper-case letters, to represent such deictic functions (see Table 6.4):

Table 6.4 Special classes of the *Integrative Levels Classification* (2nd edition).

Special classes	
A	those
B	the 1st ones
C	the 2nd ones
D-T	(etc.)
U	the typical
V	the entirety
W	together with
X	something
Y	the actual
Z	the mentioned

Source: Excerpted from ISKO Italia (2019).

To give just one example, the special class *Y*, notated after an element, stands for a specific specimen of a class (e.g., *mqvtoccg* means gray wolves, Canis lupus in general but *mqvtoccgY* means these actual gray wolves, Canis lupus) or a facet (e.g., *36* means influenced by factor in general but *36Y* means actually influenced by factor). Taking the example of the research article from above, its theme and rheme could be expressed as the complex ILC notation *mqvtoccg5osk36Ymqvtur2ttfad* (i.e., *mqvtoccg* wolves *5* through change *osk* feeding *36Y* influenced by these actual *mqvtur* deers, cervidae *2* in location *ttfad*

Liguria). As a documentary language, as emphasized by Gnoli (2018), classes and facets in combination with such special classes are expressive enough to translate natural language statements into ILC notations. A set of such statements about phenomena can be considered to form a knowledge base, as known from semantic web technologies like formal ontologies. In fact, the second edition of the ILC is already available in SKOS format (Simple Knowledge Organization System) as a standard to support knowledge organization systems within the framework of the semantic web (Park, Gnoli, and Morelli 2020; Binding et al. 2020).

As Gnoli (2020a) admits, it is highly unlikely that any new KOS like the ILC is able to compete with traditional general classifications like the widely used DDC, UDC, or LCC. Nevertheless, practical applications of the ILC include the *Basel Register of Thesauri, Ontologies and Classifications* (BARTOC), the *BioAcoustic Reference Database* (BARD), the *Friuli Venezia Giulia Regional Laboratory of Environmental Education* (LaREA), the *Dandelion Bibliography of Facet Analysis*, and the website *Where the Apennine Begins* (Gnoli 2020a). The value of the experimental *Integrative Levels Classification* can be seen in its study of the functions and effects of some innovative features in KOSs. For the present study, the most important feature is the rich potential of context representation, particularly, regarding the epistemological dimension of authorial perspectives. The next section will discuss how the expressiveness of the ILC's context representation can be further improved by a cognitive-developmental approach to knowledge organization.

6.1.2 A Methodological Critique

The main argument of this case study is that the phenomenon-based facet-analytical approach to knowledge organization in its current state, exemplified by Claudio Gnoli's international project *Integrative Levels Classification*, appears to be limited to a context representation mainly focusing on the differentiation or analysis of epistemic contexts without an integration or synthesis into a systematic organization. As described in Chapter Two, this challenge could be

termed, modified after Henry E. Bliss, as “context-index illusion” since a mere alphabetical order or term list of different epistemic contexts is in danger to lead to disorder and dispersion. It will be argued that the proposed cognitive-developmental approach to knowledge organization is able to offer two novel organizing principles for a more systematic approach that meets Bliss’s (1933) principle of maximal efficiency based on the strategies of collocation and subordination. This will be demonstrated with regard to the γ dimension of perspectives that is expressed with the 0 facet and its subcategories. However, the following methodological critique is not intended to reject the phenomenon-based facet-analytical approach in favor of the cognitive-developmental approach but to emphasize the potential contribution of the latter to the former. This is in line with Bliss (1933) who considers the analytic division of basic units of a KOS as a necessary first step before their collocative and systematic synthesis. But before the novel organizing principles will be outlined, two further issues concerning the theoretical and methodological foundations of the ILC should be discussed in more detail, namely, the underlying concept of phenomenon and the underlying model of the integrative levels.

The first issue, the *concept of phenomenon*, is related to the basic units of the ILC and its ontological and epistemological status. Although Gnoli (2011) concedes that phenomena as perceived by human beings are always influenced by both the ontological and epistemological dimensions, his ontological approach tends to consider phenomena as “neutral objects of knowledge, independent from any approach or viewpoint by which they can be treated” (ISKO Italia 2007, 8). This would imply that “the same phenomenon can be considered and discussed under different perspectives” like disciplines, domains of discourse, cultural contexts, as well as theories and methods (Gnoli 2017b, 55). As outlined in Chapter Two, this conception presents the standpoint of modernist contextualism in contrast to a postmodernist contextualism, following the terminology of Brenda Dervin (2003). Modernist contextualism treats epistemic contexts as analytic factors that can be separated from the object of interest, the phenomenon.

But such an objectified notion of context is challenged by postmodern contextualism that criticizes the essentialist and foundationalist assumption of an external, observer-independent world awaiting discovery. Instead, a fully implemented contextualism or perspectivism should acknowledge that the ontological and epistemological dimensions are inextricably intertwined, as stated by Esbjörn-Hargens and Zimmerman (2009, 35):

> Perspectivalists maintain that mind—far from being a mirror that passively receives independent phenomena—plays an active role in co-constructing phenomena. Methodologies not only reveal, but also in some respect constitute the phenomena under investigation. What we call "facts," in other words, are not ready-made but emerge in a complex process of perceptual, emotional, and cognitive negotiation between knower and known.

The crucial consequence for phenomenon-based KOSs like the ILC should be a revision of the concept of phenomenon in the way that each phenomenon needs to be considered as a relation between a known object and a knowing subject situated within the social context of an epistemic community (Kleineberg 2013a). This means that the analytical distinction between phenomena and perspectives, which is fundamental for the dimensions defined by the ILC project, should abandon the notion of an "intendedly neutral scheme" (Gnoli 2011, 95). Apparently, Gnoli (2008b, 142) considers the advancement in the history of knowledge as a trend towards more and more neutral descriptions of reality, as his terminology seems to suggest:

> The concept of, say, the magic attributes of a given plant in a traditional culture could be accounted for in a place in the scheme reflecting the classification of the world from that viewpoint, and at the same time be linked to the definition of that plant in the basic neutral scheme.

But even a basic scheme containing classes of phenomena defined according to the recent scientific worldview still remains a product of this particular worldview and should not be

described ahistorically as something reflecting a neutral perspective or a view from nowhere (cp. Kleineberg 2013a). This does not prevent a non-neutral basic scheme to function to some extent as a commonly shared reference point and switching device that allows to relate divergent perspectives within a KOS. For example, Ken Wilber's (2000, 5) AQAL framework with its "broad orienting generalizations" seeks to integrate multiple perspectives without claiming neutrality.

It is also important to note, as emphasized by Birger Hjørland (2013a) in his critical evaluation of facet analysis, that the philosophical assumption of the analytico-synthetic technique seems to be that concepts or classes of phenomena do not change their meaning in different contexts. According to Hjørland (2013a), this assumptions conflicts with recent theories of meaning and also with Thomas S. Kuhn's thesis of incommensurability. Therefore, it appears to be problematic to use a "set of preestablished classes" (Hjørland 2013a, 555) in alternative orderings to express different perspectives. Hjørland (2008a) gives the example that chemicals might be described by chemists in terms of their structural properties, whereas pharmacologists would describe them in terms of their medical effect. New conceptual structures, as Hjørland (2013a) concludes, require new classification systems. In defense of such a criticism, Szostak, Gnoli, and Lopez-Huertas (2016, 205) argue that different classification systems for different context-specific conceptual structures in the sense of the domain-analytical approach are not sufficient to meet the demands of interdisciplinary knowledge organization:

> But while views may differ within a domain, some of the most important differences occur across domains and thus will be obscured by an exclusive reliance on domain analysis.

To avoid barriers between communities with different perspectives, a general KOS should enable users to shift perspectives within one system (Szostak, Gnoli, and López-Huertas 2016). The phenomenon-based facet-analytical approach seeks to reduce ambiguity by using the analytico-synthetic technique to distinguish phenomena, relations between phenomena, and authorial

perspectives. Taking the example from above, chemicals would be classified according to their structural properties in terms of levels of organization, located higher than atoms and lower than cells, while their medical effects would be expressed by a facet of causal links, such as the fundamental category *3* by agent, cause, external factor or its subcategories (Gnoli and Szostak 2009). Even though chemists and pharmacologists have different perspectives on chemicals they should generally agree about their structural properties and medical effects. Thus, both of them might benefit from a KOS that allows to take the perspective of the other (Kleineberg 2016b). A different case is the historical change of concepts (e.g., *time* and *space* in the physics of Aristotle, Newton, and Einstein) and what one might call the simultaneity of the non-simultaneous in situations where traditional, modern, and postmodern views confront each other in current discourses on the supposedly "same" phenomenon (Kleineberg 2016b). While it is true that historical paradigm shifts result to some extent in incommensurable concepts, there is often an overarching continuity that holds them together within a developmental logic of the transformation of these concepts. For example, the concept of *time* in classical mechanics, although radically reinterpreted by the theory of general relativity, is largely integrated as a special case in the historically later and more comprehensive framework (Thagard 1992; cp. Appendix B: Table B.12). But even without such a continuity it should be possible to refer to a kind of "basic concepts" (Szostak, Gnoli, and López-Huertas 2016, 68) that are less ambiguous compared to complex concepts and that may function as common reference points interrelating a variety of perspectives or epistemic contexts. For example, the incommensurable concepts of time in the history of paradigms in physics or physical thinking in general could be expressed in ILC by means of the basic concept or class *bb* time combined with facets and foci as follows:

bb02syb	*bb* time *02 as known in locus syb* Mesopotamian civilization
bb06yiyagm	*bb* time *06* according to theory *yiyagm* Aristotelism
bb01rabpU	*bb* time *01* as known in epoch *rabpU* Middle Ages
bb06yisdc	*bb* time *06* according to theory *yisdc* classical mechanics

bb06yisdt *bb* time *06* according to theory *yisdt* general relativity

bb0yase *bb* time *0* as for *yase* common sense

Note that the ILC allows several ways of shortening complex notations for a more economical use but the examples presented in this study are primarily intended to demonstrate the basic idea of combining notational elements and, therefore, it will be refrained from introducing further details (Gnoli 2020a). The decisive point is that KOSs based on such basic concepts do not present a neutral scheme but one that privileges the mainstream view of today. The mere fact that in the arrangement of the ILC the class *bb* time presents a subclass of the main class *b* spacetime shows exemplarily the topical and time-bound character of the underlying frame of reference that appears to be inappropriate for more traditional notions of time. But this hardly avoidable conceptual ambiguity needs to be acknowledged and intentionally applied by any phenomenon-based approach (Kleineberg 2013a). It should be noted, however, that the challenge of conceptual ambiguity also applies to domain-specific KOSs since even demarcated epistemic communities have to deal with different authorial perspectives and, therefore, incommensurable concepts that need to be represented in relation to the privileged domain-specific frame of reference. A revised concept of phenomenon that acknowledges the inextricably intertwined relation between the ontological dimension and the epistemological dimension helps to better understand the limitations of any phenomenon-based KOS that seeks to integrate multiple perspectives.

The second issue, the *model of integrative levels*, refers to the organizing principle of levels as a structural component of the ILC scheme and its role for context representation. As discussed in Chapter Three, the architecture of level models depends on the strategy to deal with categorically orthogonal realms, such as material, mental, and social phenomena. Since the ILC prefers a linear sequence of main classes, the integrative character of levels cannot be maintained and the notion of *levels of integration* needs to be replaced by the less qualified

notion of *levels of organization* (Kleineberg 2017). For the latter, higher levels depend chronologically and logically on lower levels but they do not need to include hierarchically the structures and properties of their predecessors. This means that while the principle of consecutiveness (dependence relation) still holds, the principles of gradation by specialty (genus-species relation) and successive parthood (part-whole relation) are abandoned (Kleineberg 2017). For this reason, the ILC is forced to introduce a distinction between *types* as genus-species relations and *levels* as dependence relations. An alternative strategy is offered, for example, by Wilber's AQAL framework that gives up the strict linearity and presents a model of integrative levels in the proper sense based on the co-evolution of four sequences of levels that distinguish subjective, objective, intersubjective, and interobjective phenomena (Kleineberg 2016a). One advantage of such non-linear level models is that they are able to avoid the "individual/collective inconsistency" (Kleineberg 2017, 358) that violates the condition of asymmetry for strict order relations inherent in level hierarchies. For example, the sequence of the main classes of the ILC presents a linear order in which "q language is placed at the beginning of cultural phenomena, as it emerges from human mind p" (Gnoli 2020a, no pagination). In other words, the level of mind (individual phenomena) precedes the level of culture (collective phenomena). Note that in Nicolai Hartmann's (1940) original level model that is taken as an explicit reference for the ILC project the personal spirit (i.e., mind) and the objective spirit or objectivated spirit (i.e., culture) are considered to build a tripartite stratum or level in which all of them have the same structural height because they are interdependent (Kleineberg 2016a). Accordingly, *culture* depends on *mind*, but *mind* depends on *culture* as well. The decisive point is that such mutual dependence relations cannot be expressed in a linear order without violating the asymmetry of level hierarchies as strict orders stating if $x < y$ then $y < x$ does not hold (Kleineberg 2017). Consequently, dependence relations of the ILC do not necessarily follow the principles of later-in-time, later-in-evolution, and increasing complexity. As Gnoli (2020a, no

pagination) admits, “dependence of a level on another is a kind of associative relationship,” which means for documentary languages that such levels do not present hierarchical relations in the proper sense but merely less expressive association relations.

While it appears to be rather unlikely that the ILC will be restructured according to a non-linear model of integrative levels, it would be a major improvement of the ILC if there was an indication, such as entries in scope notes of the corresponding superordinate class, in which cases sibling classes are related by levels of integration, by levels of organization, or by no levels at all. As shown in the previous section, the sibling subclasses of `moral consciousness` are arranged according to genuine integrative levels, while the sibling subclasses of `organisms` and the succeeding sibling subclasses of `animals` are arranged according to levels of organization following the phylogenetic principle of later-in-evolution, whereas the sibling subclasses of `consciousness` or the succeeding sibling subclasses of `cognition` are arranged without recognizable organizing principles. These distinctions become crucial for a context representation in terms of Integrative Levels of Knowing since one of its strengths can be found in its multiple inherent order relations that offer an informational added value, as outlined in Chapter Three.

In short, a systematic context representation should be based on comprehensive and informationally rich organizing principles. The proposed cognitive-developmental approach to knowledge organization offers two of them, one for a classification of methods or methodologies and another one for a classification of viewpoints or perspectives. The remainder of this case study demonstrates how the organizing principles of Integral Methodological Pluralism and Integrative Levels of Knowing could help to improve the expressiveness of context representation in the ILC.

6.2 Organizing Principles for the Classification of Epistemic Contexts

6.2.1 Method Classification: Integral Methodological Pluralism

This section is concerned with a comprehensive and systematic classification of methods and thus with a particular kind of "authorial perspective" (Szostak 2015, 64) or context feature of documents. It will be shown to what extent the ILC's representation of methods can benefit from the organizing principle of Integral Methodological Pluralism.

Currently, methods or methodologies can be expressed by means of the ILC's perspective facet *03* `as studied by method` and its subcategories (see Table 6.5).

Table 6.5 Method facets and foci of the *Integrative Levels Classification* (2nd edition).

Facet		Focus	
0	as for, relating to *perspective, aspect, bias, viewpoint, phase relationship, dimension y*		
03	as studied by *method*		
031	as studied through *step*		
032	as studied in *environment*	yak	study environments
033	as studied using *source*	ys34w	artifacts
037	using *tool*	ab	individuals
038	taking *example, study case, sample, specimen*		
039	as studied by *research method*	yam	research methods, approaches

Source: Excerpted from ISKO Italia (2019).

Since the ILC notation of facets is based on the decimal principle, there would be room for nine subcategories of the general method facet but for the time being only six of them are defined. The most important subcategory for this study is the facet *039* `as studied by research method`. As can be seen in Table 6.5, some of the facets are linked to defined foci as already existing classes of phenomena and its subclasses. For example, the facet *032* `as studied in environment` is linked to the class *yak* `study environments` and its subclasses, namely, *yakf*

`the field`, *`yaki`* `captivity`, *`yakl`* `laboratory`, and *`yaks`* `desk, office`. Likewise, the facet *`039`* `as studied by research method` is linked to the class *`yam`* `research methods, approaches` and its numerous subclasses and even sub-subclasses. Table 6.6 offers an overview of all research methods that are currently defined in the ILC scheme, partly oriented on Szostak's (2004) listing of research methods, as a scope note reports.

Table 6.6 Representation of research methods in the *Integrative Levels Classification* (2nd edition).

Class			
yam	research methods, approaches	yamhp	playback
yamb	observation	yami	case study
yambd	discrete observation	yamj	interview
yambp	participant observation	yamk	survey, questionnaire
yamc	experience, intuition	yaml	review of bibliographical sources
yamd	examination of physical tracks	yamlt	textual analysis
yame	sensing, detection, measurement	yamm	mathematical analysis, processing
yamea	censusing, counting	yamn	probability estimation
yames	satillite imagery	yamo	statistical analysis
yamet	telemetry, remote sensing	yamod	descriptive statistics
yamett	acoustic telemetry	yamoi	inferential statistics
yametu	ultrasonic telemetry	yams	modeling, simulation
yamf	recording	yamsg	game theoretic models
yamfa	taking notes	yamu	mapmaking
yamfc	taking pictures	yamv	comparison, comparative method
yamfn	sound recording	yamx	classification, systematics, taxonomy
yamfv	filming	yamxn	numerical taxonomy, phenetic
yamg	marking, labeling, tagging	yamxp	evolutionary analysis, phylogenetic
yamh	experimentation, stimulation	yamxq	cladistic analysis

Source: Excerpted from ISKO Italia (2019).

This classification of research methods covers a broad range of common research practices and techniques and offers a comparatively rich vocabulary that can be used for the context representation of authorial perspectives. From a systematic point of view, however, this classification also appears to be limited in several ways since the strategies of collocation and subordination are only applied to a rather initial extent. For example, the first hierarchy level of subclasses of *yam* research methods (e.g., *yamb* observation, *yamc* experience, intuition, *yamd* examination of physical tracks, *yamj* interview, *yamo* statistical analysis, *yamu* mapmaking, yamv comparison, comparative method) present a mere listing without recognizable organizing principles, neither systematically nor alphabetically. Note that the strictly succeeding alphabetical order is occasionally replaced by a mnemonic technique in which single letters from the verbal caption are used for the notation (e.g., *yambd* discrete observation; *yambp* participant observation).

For the user, it is not obvious why the currently defined research methods are arranged in that particular order, if and how research methods that are collocated next to each other are thematically related, and whether or not this listing of research methods is supposed to be comprehensive or merely an exemplary collection. The same questions arise for the next hierarchy level of sub-subclasses (e.g., *yamod* descriptive statistics, *yamoi* inferential statistics), although these specifications or types clearly present the strategy of subordination. In other words, the ILC's representation of research methods presents itself in the form of a term list added by a few hierarchical relations that indicate specifications of given research methods. But in contrast to a systematic and comprehensive classification deduced from basic principles of organization, this listing appears to be inductively derived and open for further complements and specifications. These methodological limitations can be described in the terminology introduced in Chapter Three as an empirical-pragmatic approach that might

benefit from a complementary formal-pragmatic approach concerned with more general patterns of epistemic contexts (Kleineberg 2016c).

In the following, such a formal-pragmatic approach will be outlined in the form of Ken Wilber's (2006) Integral Methodological Pluralism derived from his AQAL framework. As initial orientation, a conceptual differentiation between methods in the narrower sense and methodologies in the broader sense may be helpful. As noted by Dervin (2003), the notion of methodology is often reduced to method, although it refers rather to the theoretical analysis of methods. For this reason, Hjørland (2000) argues for a clear-cut distinction between methods as applied research techniques and methodologies that are concerned with problems of epistemology or the philosophy of science. Furthermore, Cibangu (2010) emphasizes that both methods and methodologies as sets of such methods are grounded in foundational paradigms. But while methodologies and paradigms by themselves can be very numerous and dynamic, the IMP seeks to identify some major "methodological families" (Esbjörn-Hargens 2006, 84) that are limited in number and stable over time. In this regard, the AQAL framework offers a typology of eight fundamental methodological zones derived from three formal-pragmatic distinctions (see Figure 6.1).

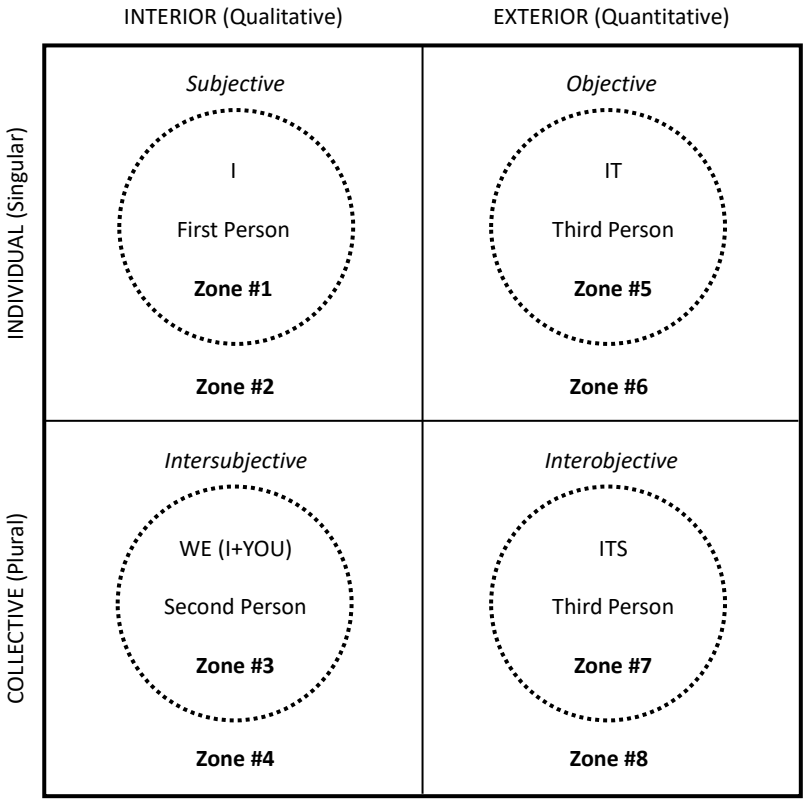

Figure 6.1 Methodological zones of the AQAL framework (based on Wilber 2006, 36, 39: Figures 1.2, 1.4).

The typology of the IMP is closely related to Habermas's (2003a) typologies of perspectives (i.e., first person, second person, third person) and world relations (i.e., subjective, social, objective) and its underlying formal-pragmatic distinctions reflect important methodological distinctions commonly labeled as qualitative methodologies vs. quantitative methodologies (Hjørland 2000; Dervin 2003; Ma 2012; Chu 2015), methodological individualism vs. methodological collectivism (Hjørland 1997; Ritzer 2001), and inside views vs. outside views (Ma 2012). In Figure 6.1, the first two distinctions are depicted by the borderlines that demarcate the four quadrants, while the third distinction is depicted by a dotted circle within each quadrant.

In more detail, the *qualitative/quantitative distinction* refers first and foremost to the kind of phenomenon or object under investigation, that is, interior phenomena (e.g., perceptions, emotions, thoughts, cultural worldviews, historical horizons) or exterior phenomena (e.g.,

chemical substances, cellular networks, organismic behavior, human bodies, technical infrastructures). While quantitative methodologies are characteristic for the natural sciences using the so-called scientific method based on empirical or positivist epistemologies, the social sciences and humanities concerned with human-related phenomena can apply both quantitative and qualitative methods or a mix of them. This depends on the given research focus on interior aspects that require interpretation and qualitative analysis or exterior aspects that can be measured and quantified in numbers. But as emphasized by Olson (2013), there is often a lack of coherent definitions of qualitative and quantitative research since to some extent qualitatively gathered data can also be quantified and quantitatively gathered data are also open to interpretation. Furthermore, Olson (2013) argues that the quantitative/qualitative distinction is less a matter of chosen methods but more related to the ontological and epistemological assumptions of researchers, such as positivist or objectivist paradigms in contrast to interpretive or subjectivist paradigms. Therefore, it is important to note that the IMP's qualitative/quantitative distinction is defined in a narrower sense restricted to interior-related and exterior-related methodologies with the advantage to present a clear-cut distinction.

The *individual/collective distinction* refers to the singular or plural form of the investigated phenomenon. In the social sciences, the common distinction between methodological individualism and methodological collectivism or holism refers to the focus of explanation as either related to the subjective world of an individual or to the social world of groups, cultures, and institutions (Ritzer 2001). More generally, the IMP's individual/collective distinction applies not exclusively to human-related phenomena but to micro-level explanations (e.g., parts, elements, individuals) and macro-level explanations (e.g., wholes, systems, groups) in a broader sense.

Finally, the *inside/outside distinction* refers to the direct or indirect view of a researcher in relation to the phenomenon under investigation. For example, the study of subjective

phenomena like human consciousness can be approached either from an inside view when a researcher observes directly the own consciousness to which she or he has privileged first-hand access or from an outside view when a researcher observes indirectly the consciousness of other persons by means of psychometric tests, interviews, or other second-hand experiences. For the study of intersubjective phenomena like human culture, Ma (2012, 1864) describes the inside/outside distinction in a very similar terminology:

> To attain an insider, participant view and an intersubjective understanding of the culture, the researcher must take a position (including the first-, second-, and third-person positions) with the cultural group, for observing as an "outsider" or a "neutral researcher" (i.e., maintaining a third-person position without taking a first- or second-person position) implies a subject-object relationship with the cultural group.

Likewise, the study of objective phenomena like the exterior aspects of an organism can be approached either from an inside view that investigates how an organism like a frog or a bat is able to register its environment through its own materiality (e.g., sensory organs, neural impulses) or from an outside view that also takes aspects into account that cannot be registered by the investigated organism itself (cp. Maturana and Varela 1987). In a similar way, interobjective phenomena like the exterior aspects of social systems can be approached either from an inside view that investigates how a social system like the economic system or the law system interacts with its environment or from an outside view that also takes aspects into account that are not part of the reality of the investigated social system (cp. Luhmann 1986).

The main advantage of these three formal-pragmatic distinctions is that they present general patterns that apply to any epistemic context in which methods or methodologies are used, such as scientific disciplines or epistemic communities. This means that the deduced eight methodological zones of the IMP present a systematic order of basic methodological approaches that are limited in number, stable over time, and comprehensive in coverage (see Table 6.7).

Table 6.7 Methodological zones according to the Integral Methodological Pluralism.

Formal-pragmatic distinctions			Methodological zone	Representative methodology
Qualitative	Individual	Inside	#1	Phenomenological analysis (e.g., Husserl)
		Outside	#2	Cognitive analysis (e.g., Piaget)
	Collective	Inside	#3	Hermeneutic analysis (e.g., Gadamer)
		Outside	#4	Structuralist analysis (e.g., Lévi-Strauss)
Quantitative	Individual	Inside	#5	Autopoietic analysis (e.g., Maturana and Varela)
		Outside	#6	Behavioral analysis (e.g., Skinner)
	Collective	Inside	#7	Autopoietic social systems analysis (e.g., Luhmann)
		Outside	#8	Social systems analysis (e.g., Bertalanffy)

Source: Based on Kleineberg (2016c, 137: Table 2).

As an organizing principle for KOSs, the IMP also supports the collocation of thematically related methods or methodologies. In this regard, the qualitative/quantitative distinction appears to be the most common point of departure followed by the distinctions between methodological individualism and methodological collectivism, as well as inside views and outside views. Since the IMP emphasizes both the methodological pluralism and the complementary character of methodological zones, this organizing principle seems to be well suited to guide interdisciplinary and multi-methods research. First, it helps to disambiguate mixed-methods approaches by differentiating techniques and research practices according to methodological zones. Second, it helps to visualize the complementary character of these methodological zones by locating the counterparts of a given zone within the AQAL framework. Third, it helps to identify potential methodological reductionism of given research projects by revealing neglected methodological zones. And fourth, it helps to explicate the often only implicitly applied methods or methodologies from the research literature or other documents in terms of methodological zones by asking three simple questions (Kleineberg 2016c):

1. Is it a qualitative or quantitative approach?
2. Is the focus on an individual or collective?
3. Is it an inside or outside view?

In this way, the inductively derived and rather randomly selected research methods that are currently represented in the ILC can be related to the more systematic organization of methodological zones in order to gain a more expressive or informationally more rich documentary language that allows to identify overlapping methods, to collocate similar methods, and to detect missing method. For example, the method *yamh* `experimentation` should be disambiguated into quantitative approaches (e.g., chemical experiments) and qualitative approaches (e.g., psychological experiments). Furthermore, the family of qualitative methods including *yambp* `participant observation`, *yamj* `interview`, or *yamlt* `textual analysis` should be collocated next to each other or within a common superordinate class. Finally, representative methods of apparently neglected methodological zones, such as zone #5 (e.g., autopoietic analysis) and zone #7 (e.g., social autopoietic analysis) should be added to the ILC's representation of research methods.

In principle, such an IMP-based analysis can be applied to any domain of inquiry. For example, Esbjörn-Hargens and Zimmerman (2009) use the IMP for the domain of ecology, environmental studies, and ecological thought by analyzing and indexing the underlying authorial perspectives of documents in terms of methodological zones. Table 6.8 presents a small sample from their study that covers more than 200 different approaches within this highly interdisciplinary field that is characterized by the involvement of multiple perspectives and methods.

Table 6.8 Examples of method analysis and indexing based on Integral Methodological Pluralism.

Document	Approach	Perspective on nature (within the domain of ecology and environmental studies)	Methodological zone
Cybernetics. Or the Control and Communication in the Animal and the Machine by Norbert Wiener, 1961	Cybernetics	Cybernetics is the study of communication, information exchange, and feedback loops within organisms, machines, and social systems.	#7, #8
The Selfish Gene by Richard Dawkins, 1976	Modern evolutionary synthesis	Neo-Darwinism has come to be associated with the modern evolutionary synthesis, which explains natural selection through genetic inheritance.	#6, #8
Autopoiesis and Cognition. The Realization of the Living by Humberto Maturana and Francisco Varela, 1980	Autopoiesis theory	Autopoiesis theory describes how organisms, which are self-organizing, cognize and react to their environment.	#5, #6
Neuroethology by Jörg-Peter Ewert, 1980	Neuroethology	Neuroethology is the study of the neurological aspects of natural animal behavior.	#6
Dwelling, Place, and Environment. Towards a Phenomenology of Person and World, David Seamon and Robert Mugerauer, 1985	Ecological phenomenology	Ecological phenomenology utilizes the methodologies of phenomenological inquiry to "resee" ecological and natural phenomena freed from our habitual ways of conceiving and experiencing, thereby opening up new horizons of perception and action.	#1, #3
Cultural Ecology by Robert Netting, 1986	Cultural ecology	Cultural ecology draws ideas from evolutionary biology (e.g., "adaptation" and "niche") to study the ways that the natural environment contributes to cultural and social realities in tribal and rural contexts.	#3, #4, #8
Development and Evolution. Complexity and Change in Biology by Stan Salthe, 1993	Developmental systems dynamics	Developmental systems ecology is the study of how ecological systems store increasing amounts of information as they develop.	#1, #2, #3, #4 5#, #6, 7#, #8
Comparative Psychology. A Handbook by Gary Greenberg, 1998	Comparative psychology	Comparative psychology is the comparison of behaviors between species as a means of gaining insight into their structures of psychology, cognitive processes, and learning capacity.	#2, #5, #6
Cybersemiotics. Why Information Is Not Enough by Søren Brier, 2008	Cybersemiotics	Cybersemiotics is a transdisciplinary nonreductionist approach to cognition and communication that studies the exchange of information and meaning in organisms.	#1, #3, 5#, #7

Source: Excerpted from Esbjörn-Hargens and Zimmerman (2009, 489-530: Appendix).

For an integration of the IMP to the *Integrative Levels Classification*, it seems to be fruitful to define a further subcategory of the perspective facet *03* as studied by method, for example, *034* as studied by methodological zone with an entry in the scope note that these zones are defined according to Wilber's (2006) Integral Methodological Pluralism. Likewise, there should be a suggested link to the defined foci, that is, a class of phenomena located as a sibling class to *yam* research methods, such as *yan* methodological zones. The simplest way to represent the methodological zones in the ILC would be to define sibling subclasses of *yan* methodological zones notated in alphabetical order as follows:

yanb qualitative, individual, inside methodology (zone #1)
yanc qualitative, individual, outside methodology (zone #2)
yand qualitative, collective, inside methodology (zone #3)
yane qualitative, collective, outside methodology (zone #4)
yanf quantitative, individual, inside methodology (zone #5)
yang quantitative, individual, outside methodology (zone #6)
yanh quantitative, collective, inside methodology (zone #7)
yani quantitative, collective, outside methodology (zone #8)

A more sophisticated way of classifying methodological zones would be to apply the strategy of subordination by using formal-pragmatic features that are inherited in hierarchical relations. In this case the strictly succeeding alphabetical order should be replaced by the commonly applied mnemonic technique of the ILC in which single letters from the verbal caption are used for the notation:

yanl qualitative methodology
yanlb qualitative methodological individualism
yanlbi inside view (zone #1)
yanlbo outside view (zone #2)
yanlc qualitative methodological collectivism
yanlci inside view (zone #3)
yanlco outside view (zone #4)

yann quantitative methodology

yannb quantitative methodological individualism

yannbi inside view (zone #5)

yannbo outside view (zone #6)

yannc quantitative methodological collectivism

yannci inside view (zone #7)

yannco outside view (zone #8)

This way of classifying methodological zones has the additional advantage that not all formal-pragmatic distinctions need to be specified since thematically related zones are collocated to some extent. A document can be indexed without qualifying the inside/outside distinction (e.g., *yanlb* qualitative methodological individualism) or even the individual/collective distinction (e.g., *yann* quantitative methodology). Thus, these strategies of subordination and collocation provide a better support for users searching for similar or complementing research methods or methodologies.

Finally, an ILC notation of authorial perspectives in terms of methodological zones needs to combine a class of phenomena as the document's subject matter and a facet with a focus as the author's epistemic context. Taking Jörg-Peter Ewert's *Neuroethology* from the previous table as an exemplary document, its complex ILC notation could be expressed as *mqaon034yannbo* (i.e., *mqaon* animal nervous system *034* as studied by methodological zone *yannbo* quantitative methodological individualism, outside view (zone #6)).

6.2.2 Viewpoint Classification: Integrative Levels of Knowing

This section is concerned with a comprehensive and systematic classification of viewpoints and thus with another kind of "authorial perspective" (Szostak 2015, 64) or context feature of documents. It will be shown to what extent the ILC's representation of viewpoints can benefit from the organizing principle of Integrative Levels of Knowing.

Currently, viewpoints in the broadest sense can be expressed by means of the ILC's facet *0* perspective and its numerous subcategories, as listed in Table 6.3. At least three of its subcategories also provide suggested links to classes of phenomena as defined foci, namely, the subcategory *06* according to theory refers to the class *ye* theories, the subcategory *07* studied in discipline, field refers to the class *yi* disciplines, and the subcategory *08* illustrated by story, modality refers to the class *yaq* veracity. But the ILC's classification scheme offers many more classes of phenomena that may function as foci for the facet of perspective. First and foremost, the main class *y* knowledge and its subclasses cover a broad range of further kinds of viewpoints, such as *y95* by knowledge process, *yas* style of thought, *yasw* world views, or *yev* paradigms. Additionally, there are many other classes that appear to be useful in combination with the facet of perspective like *p* consciousness, *po* cognition, *qaq* communicative functions, *r* rituals (e.g., tradition, mores, spirituality, religion), *st* people (e.g., nations, ethnic groups, ethnicities), and *sy* civilizations. In other words, the *Integrative Levels Classification* already provides an extraordinary rich vocabulary for the representation of epistemic contexts in terms of viewpoint.

From a systematic point of view, however, most of these attempts to classify authorial perspectives appear to be limited in several ways. On one hand, particular typologies or listings for different kinds of viewpoints like disciplines or worldviews often present only exemplary collections that are not even intended to be general in scope. On the other hand, the strategies of collocation and subordination are only applied to a rather initial extent due to a lack of adequate principles of organization. For example, the subclasses of *yas* styles of thought and *yasw* world views are apparently neither comprehensively nor systematically organized but represent rather flat term lists (see Table 6.9).

Table 6.9 Representation of styles of thought in the *Integrative Levels Classification* (2nd edition).

Class	
yas	styles of thought
yase	common sense, popular knowledge
yasm	magic thought
yass	scientific thought, rational enquiry
yasw	world views, Weltanschauungs, lifestances, general beliefs
yaswb	spiritualism
yaswd	vitalism
yaswg	mechanism
yaswm	emergentism
yaswn	general systems theory
yasws	cognitivism
yaswu	hermeneutics

Source: Excerpted from ISKO Italia (2019).

Similar to the open questions regarding the ILC's representation of research methods discussed in the previous section, it is not obvious for users why the currently defined styles of thought are arranged in that particular order, if and how styles of thought that are collocated next to each other are thematically related, and whether or not this listing of styles of thought is supposed to be comprehensive or merely an exemplary collection.

Again, these methodological limitations seem to be related to an empirical-pragmatic approach that might benefit from a complementary formal-pragmatic approach concerned with more general patterns of epistemic contexts (Kleineberg 2018; 2020). In the following, such a formal-pragmatic approach will be outlined in the form of the organizing principle of Integrative Levels of Knowing. According the Habermas's (2001a; 2003) hermeneutic reconstructionism, both principles of organization, the IMP and the ILK, can be related to different dimensions of rational reconstructions of communicative actions. While the Integral Methodological Pluralism

refers to the synchronic or *horizontal dimension* that reconstructs formal-pragmatic distinctions (e.g., world relations, types of action, modes of communication, basic attitudes, validity claims) in relation to communicative competence (see Table 3.2), the Integrative Levels of Knowing refer to the diachronic or *vertical dimension* that reconstructs how this competence develops over time (see Table 3.3). Taking the AQAL framework as a point of reference, the former is related to the *quadrants* (see Figure 3.4), while the latter is related to the *levels* (see Figure 3.5). Since the present study proposing the cognitive-developmental approach to knowledge organization has already discussed conceptions and models of ILK at length, this section will focus on its application to the *Integrative Levels Classification*.

The basic idea is to organize the *epistemological dimension* of human knowledge in the same way as the traditional principle of integrative levels organizes the *ontological dimension* of human knowledge. Like the plethora of world phenomena can be classified according to different integrative levels or *levels of being* from the most fundamental to the most complex, the plethora of world perspectives can be classified according to different integrative levels or *levels of knowing* from the most fundamental to the most complex. The main advantages of such a principle of organization is to be comprehensive or general in scope, to provide hierarchical relations or the strategy of subordination, as well as thematic or associative relations or the strategy of collocation.

An important finding of the present study is that the notion of Integrative Levels of Knowing needs to be qualified in several ways. First, ILK can be found in both individual development and collective development but without showing a direct parallelism, which is why these *different kinds of development* need to be treated separately. Second, there is no all-embracing development of an individual or a collective but an uneven distribution of domain-specific skills or competences, which is why *different developmental lines* need to be treated separately. And third, although there already exists a broad range of ILK models, such rational

reconstructions of the implicit know-how of communicative actors are in principle fallible and open to modification, which is why *different models* of a given developmental line need to be treated separately.

For an application of Integrative Levels of Knowing to the *Integrative Levels Classification*, the first distinction between individual and collective development can be addressed by differently defined foci or classes of phenomena that qualify a facet of perspective. For example, ILK models of individual development should refer to the main class *p* consciousness and its subclasses that represent the individual mind or Nicolai Hartmann's (1940) personal spirit, whereas ILK models of collective development should refer to the subsequent main classes that represent the collective counterpart in terms of culture and society or Nicolai Hartmann's (1940) objective spirit or objectivated spirit. From these subsequent main classes only the main classes *q* language, *r* rituals, and *y* knowledge seem to be concerned significantly with interior aspects of collective phenomena. Among them, the main class *y* knowledge appears to be the most suitable for an application of ILK in the sense of collectively shared forms of knowing, for it already covers the fairly similar class *yas* style of thought and its subclasses.

Note that Integrative Levels of Knowing function thus as both perspective facets and phenomena classes. Just as research methods are defined by the ILC as both the perspective facet *039* as studied by research method and the phenomena class *yam* research methods, levels of knowing should be defined as both too. Unfortunately, the decimal principle restricts the subcategories of the perspective facet *0* to a number of nine and all of them are already defined by other kinds of viewpoints that appear to be inappropriate to include ILK (see Table 6.3). This problem could be solved either by finding a kind of auxiliary mean for the notation of further subcategories, in analogy to the letter *z* as an "emptying digit" (Park, Gnoli, and Morelli 2020, 41) that allows to define additional subclasses of phenomena beyond the limited number of 24 letters, or by subdividing an existing subcategory (e.g., *06* according to theory) into two

or several sub-subcategories that also include one concerned with levels of knowing. Since such a decision should be made by the ILC project, this study will assume a hypothetical notation for Integrative Levels of Knowing within the β dimension of perspectives: *06* as for level of knowing). Additionally, there should be a scope note that refers to the conception of ILK proposed by the present study (see also Kleineberg 2014; 2020).

For the γ dimension of phenomena, there are several options to define ILK as foci. Since Kohlberg's ILK model of moral consciousness in individual development is already defined as a subclass of cognition (i.e., *pou* moral consciousness) and its subclasses that define the particular moral stages or levels of knowing (e.g., *poud* punishment and obedience orientation, *poum* law and order orientation), one option would be to add other ILK models of individual development as sibling classes to *pou* moral consciousness (e.g., *poq* aesthetic experience, *pos* religious judgment). But this might produce confusion to some extent for two main reasons. First, there already exist sibling classes of *pou* moral consciousness that do not present ILK models but refer to more general fields of cognition, such as *pod* attention, *poe* memory, *poi* imagination. And second, there are other subclasses of *p* consciousness or *po* cognition that use a similar terminology as some ILK models, such as *ps* self or *por* reason. Therefore, it will be argued that all domain-specific ILK models of individual development (see Table 4.3) should be collocated in one place within the class *po* cognition, such as in a newly defined attribute class *poal* levels of knowing. Again, there should be a scope note that refers to the conception of ILK models of individual development, as proposed by the present study. Note that this option would imply to reclassify *pou* moral consciousness as a subclass of *poal* levels of knowing, for example, as *poalm* moral development.

Likewise, domain-specific ILK models of collective development (see Table 4.4) should also be collocated in one place. As argued above, the most suitable class to represent collectively shared forms of knowing or ways of thinking seems to be *yas* style of thought. Accordingly,

there could be a newly defined subclass like *yasl* levels of knowing with a scope note entry that refers to the conception of ILK models of collective development, as proposed by the present study.

The second distinction that qualifies the notion of Integrative Levels of Knowing are different domain-specific lines of development. These can be addressed by specifying the class *poal* levels of knowing for individual development and the class *yasl* levels of knowing for collective development by adding a range of subclasses representing particular ILK models. For individual development, these may include ILK models that are exemplarily described in Chapter Four (see also Appendix B):

poal levels of knowing
- *poale* ego-identity development
- *poalf* faith development
- *poali* interpersonal development
- *poall* logico-mathematical development
- *poalm* moral development
- *poaln* intellectual and ethical development
- *poals* skill development
- *poalt* task development

Likewise, exemplary ILK models for the collective dimension may include (see also Appendix C):

yasl levels of knowing
- *yasla* artistic development
- *yaslc* cognitive-cultural development
- *yaslr* religious development
- *yasls* scientific and religious development
- *yaslw* worldview development

The level sequence of each ILK model can be represented by sibling subclasses that are organized according to the principle of integrative levels indicated by a strictly alphabetical order, as illustrated by the following three examples:

```
poal       levels of knowing
   poall      logico-mathematical development
      poallb     sensorimotor
      poallc     preoperational
      poalld     concrete operations
      poalle     formal operations

   poalm      moral development
      poalmb     punishment and obedience orientation
      poalmc     instrumental exchange
      poalmd     pleasing expectations
      poalme     law and order orientation
      poalmf     youthful protest
      poalmg     utilitarian orientation
      poalmh     universal ethical principle orientation

yasl       levels of knowing
   yasls      scientific and religious development
      yaslsb     primitive
      yaslsc     archaic
      yaslsd     classical
      yaslse     empirical-critical
```

Finally, the third distinction that qualifies the notion of Integrative Levels of Knowing is related to differences of ILK models concerned with the same developmental line. These models might differ because they are rationally reconstructed either by different researchers or at different times by the same researcher. This issue can be addressed by a scope note entry that refers to the specific ILK model on which this part of the classification is based. For example, the original ILK model of logico-mathematical development reconstructed by Jean Piaget (1999) has been

expanded by the so-called Neo-Piagetian research in order to include also *postformal* forms of thinking in terms of one or several higher levels of knowing (Benack 1984; Sinnott 1998; Young 2011; see also Appendix B: Table B.5, Appendix D: Tables D.13-28).

In general, the representation of viewpoints in terms of levels of knowing requires a complex ILC notation that combines a class of phenomena as the document's subject matter and a facet with a focus as the author's epistemic context. In Appendix E, the Table E.1 presents already existing examples of viewpoint analysis and indexing based on various models of Integrative Levels of Knowing. By taking one selected document from this table, it will be demonstrated how to create the corresponding ILC notation. The ancient Chinese anthology *Mozi*, also known as the Mohist canon, from the period of the Warring States (c. 453-221) is attributed to the philosopher Mozi or Mo Di, the founder of the school of Mohism, but written and compiled by his followers. The *Mozi* is concerned with many branches of knowledge but the most significant subject matters can be found in the so-called dialectical chapters treating philosophical topics like *logic* and *ethics*. These subject matters can be written in ILC notations as *yiyg* philosophical logic and *yiyr* moral philosophy.

The authorial perspectives or levels of knowing manifested in the *Mozi* can be identified as early forms of the *level of formal-operational cognition* according to Piaget's model of logico-mathematical development (Barnes 2000), the *level of social contract or utility and individual rights* (postconventional moral judgement) according to Kohlberg's model of moral development (Roetz 1993), and the *level of classical or axial culture* according to Barnes's model of scientific and religious development (Barnes 2000). These epistemic contexts in terms of viewpoints or levels of knowing can be written in ILC notations by means of the perspective facet *06* as for level of knowing using the foci *poalle* formal operations, *poalmg* utilitarian orientation, and *yaslsd* classical.

The combination of subject matter and epistemic context could be written in ILC notation in this way: *yiyg06poalle* (i.e., *yiyg* philosophical logic *06* as for level of knowing *poalle* formal operations) and *yiyr06poalmg* (i.e., *yiyr* moral philosophy *06* as for level of knowing *poalmg* utilitarian orientation). Since the third perspective facet *06yaslsd* (i.e., *06* as for level of knowing *yaslsd* classical) is related to both themes *yiyg* philosophical logic and *yiyr* moral philosophy, their combination could be expressed by means of the special class *WA* together with that functions as a conjunction symbol: *yiygWAyiyr06yaslsd* (i.e., *yiyg* philosophical logic *WA* together with *yiyr* moral philosophy *06* as for level of knowing *yaslsd* classical). In order to express several themes and their underlying viewpoints, the notation elements mentioned above need to be separated by blank space and may also use the special class *WA* together with but this time for the foci: *yiyg06poalleWAyaslsd yiyr06poalmgWAyaslsd*.

6.3 Summary

The case study on the interdisciplinary knowledge organization system *Integrative Levels Classification* demonstrates a methodological contribution of the cognitive-developmental approach to knowledge organization. The premise of multi-perspective knowledge organization that implicit authorial perspectives of documents should be made explicit by means of context representation is shared with the prevailing context-aware approaches to document indexing, such as Claudio Gnoli's phenomenon-based facet-analytical approach, exemplified by his *Integrative Levels Classification*. But in its current state, the ILC project appears to be mainly concerned with the differentiation of epistemic contexts by providing largely unstructured listings of terms as documentary language. According to Habermas, such a basically inductive approach to authorial perspectives can be related to empirical pragmatics in opposition to formal pragmatics that is much more interested in general patterns and thus principles of organization

that allow a basically deductive approach to authorial perspectives. In order to improve the expressiveness of the ILC's context representation, the proposed cognitive-developmental approach based on formal-pragmatic distinctions offers two novel organizing principles for a more systematic organization that meets Bliss's principle of maximal efficiency based on the strategies of subordination and collocation.

The main finding is that both principles of organization, the Integral Methodological Pluralism for method classification and the Integrative Levels of Knowing for viewpoint classification, are comprehensive in scope and offer informationally rich conceptual relations like hierarchical relations and thematic or associative relations. Thus, the epistemic pluralism presented by the multiplicity of authorial perspectives in terms of methods and viewpoints can be organized according to a non-relativistic framework and without falling prey to disorder and dispersion. In other words, the organizing principles of IMP and ILK offers a broader view to see the big picture, or, to invoke the metaphor from the introduction, the daylight for the blind men who investigate an elephant.

7 CONCLUSION

7.1 Beyond Absolutism and Relativism

The present study is concerned with the challenge of epistemic pluralism in the field of knowledge organization. This challenge has been illustrated with the parable *The Blind Men and the Elephant* and its passed down wisdom that human knowledge is derived from multiple perspectives and that a single vantage point should not be overgeneralized. Philosopher Jürgen Habermas (1984, 135) summarizes the strategies to deal with this challenge as follows:

> Only a systematic history of rationality would keep us from falling into sheer relativism or naively positing our own standards as absolute.

It is worth noting that for some reason the English translation misses the original parenthesis "von der wir weit entfernt sind" (from which we are far away) (Habermas 1981, 194) after the word *rationality*. Thus, one should keep in mind that for the time being the task to establish a comprehensive and systematic organization of the epistemological dimension of human knowledge that goes beyond both a naive epistemic absolutism and a self-refuting epistemic relativism is still an open one and probably a mission that will never be accomplished completely.

Nevertheless, the proposed cognitive-developmental approach to knowledge organization based on Habermas's Theory of Communicative Action takes a first step by introducing the notion of Integrative Levels of Knowing to the field of knowledge organization. The basic idea is that complexity can be reduced by relating the empirical diversity of perspectives to a manageable amount of *forms* of knowing which, in turn, present distinct developmental stages or *levels* of knowing within an overarching learning process following a developmental logic. The very fact that such structural learning processes take place shows that the comparison and evaluation of different frames of references are possible in principle and

thus undermines the view that standards or criteria of rationality can only be valid within a single frame of reference. This does not mean that there exist some absolute standards but rather developmental or "self-reflective standards" (Habermas 2001b, 148) in that each newer or higher level of learning ability can be considered to be a reflective abstraction of the previous level and a more advanced level of justification that allows to analyze and overcome the limitations and inadequacies of previous frames of references. Such a long-term process of rationalization, however, should not be conflated with a naive progressivism that does neither acknowledge the context-dependent dynamics of development nor the dialectic of progress that always includes the possibilities of new forms of pathologies or inadequacies.

Regarding human knowledge recorded in documents or information resources, the challenge of epistemic pluralism has been considered along two analytical dimensions that are concerned with both the context of mediation or the information professionals's perspectives and the context of production or the authorial perspectives. The first dimension, *knowledge organization in context* or the analysis of the epistemological foundations of given KOSs within their cognitive, cultural, and historical environments, can benefit from the notion of Integrative Levels of Knowing as a tool for comparison and evaluation. This has been shown exemplarily for the ancient Chinese library classification *Seven Epitomes*. The main finding is that the supposedly culture-specific difference between correlative and analytic approaches to classification can be related to distinct levels within a transcultural developmental-logical sequence of classificatory cognition. This helps to reduce the complexity of epistemic pluralism, to compare seemingly unrelated cultural or historical contexts, and to evaluate the validity of knowledge claims not merely by standards of a single given frame of reference but according to different levels of justification, that is, standards that themselves develop from one frame of reference to another by differentiating from but also integrating the previous ones.

The second dimension, *context in knowledge organization* or the analysis of authorial perspectives and their representation in KOSs, can benefit from the notion of Integrative Levels of Knowing as a novel organizing principle. This has been shown exemplarily for the *Integrative Levels Classification*. The main finding is that the expressiveness of context representation can be improved by providing a comprehensive and systematic organization of fundamental forms of knowing based on the strategies of subordination and collocation. This too helps to cope with the challenge of epistemic pluralism and to avoid a fragmentation of knowledge that unstructured term lists as indexing languages seem to suggest.

Additionally, the notion of Integrative Levels of Knowing may also shed new light on the different epistemological or metatheoretical perspectives that underlie KO research, including the present study. Most importantly, the three philosophical positions of epistemic absolutism, epistemic relativism, and the third alternative proposed by the cognitive-developmental approach should be considered in the light of distinct levels of justification. In KO discourse, the stereotypically opposed positions of *epistemic absolutism* and *epistemic relativism* can be found to a more or lesser degree, for example, in the confronting approaches of *classification-as-ontology* versus *classification-as-epistemology* (Mai 2011), or *modern contextualism* versus *postmodern contextualism* (Dervin 2003). According to some cognitive-developmental models, these positions can be related to succeeding levels within a given sequence, for example, from *dualism* to *relativism* (Benack 1984; Perry 1968; Blanchard-Fields 1989; see also Appendix B: Tables B.5, B.6, B.35), from *conscientious* to *individualist* (Esbjörn-Hargens and Zimmerman 2009; Cook-Greuter 2010a; see also Appendix B: Tables B. 10, B.15), from *individuative-reflective* to *conjunctive* (Fowler and Dell 2006; DiPerna 2018; see also Appendix B: Tables B.14, B.17), from *static systems* to *dynamic relativism* (Kramer 1989; see also Appendix B: Table B.28), from *formal-operational* to early forms of postformal or *vision-logic* (Wilber 2000; see also Appendix

B: Table B.46), or from *modern* to *postmodern* (De Witt and Hedlund 2017; see also Appendix C: Table C.4).

Such a developmental perspective suggests that the frame of reference underlying epistemic relativism indeed presents a more advanced level of justification compared to the one underlying epistemic absolutism. But most of these models also suggest that this much more context-aware frame of reference presents by no means the highest or most advanced stage of development since some inherent problems or cognitive dissonances, such as its apparently performative self-contradiction, seem to require even more advanced levels of knowing to be solved. For example, in Deidre A. Kramer's (1989; see also Appendix B: Table 27) model of social cognition the level of *dynamic relativism* is followed by the level of *dynamic dialecticism* that is characterized by an integration of cultural and historical contexts into evolving social structures. Likewise, in Suzanne R. Cook-Greuter's (2010a; see als Appendix B: Table B.10) or Sean Esbjörn-Hargen's and Michael E. Zimmerman's (2009; see also Appendix B: Table B. 15) models of ego-identity or self-development the *individualist* level is followed by the *autonomous* level that is characterized by an understanding and appreciation of conflicting views and a commitment to organize and integrate the multiplicity of perspectives in order to overcome the pitfalls of various kinds of relativism. In fact, this level is described as the first one in self-development at which knowing subjects "recognize the value of all previous levels as necessary for healthy human development" (Esbjörn-Hargens and Zimmerman 2009, 137). From such a developmental perspective, the three philosophical positions can also be related to what Wilber (2000, IX [emphases in original]) calls universal formalism, pluralistic relativism, and universal integralism:

> But once consciousness evolves from formal to postformal—and thus evolves from universal formalism to pluralistic relativism—these multiple contexts and pluralistic tapestries come jumping to the fore, and postmodernism has spent much of the last two decades attempting to *deconstruct* the rigid hierarchies, formalisms, and oppressive schemes that are inherent in preformal-to-formal stages of consciousness evolution. But

> pluralistic relativism is not itself the highest stage of development [...]. Pluralistic relativism gives way to *universal integralism*. Where pluralism frees the many different voices and multiple contexts, universal integralism begins to bring them together into a harmonized chorus.

7.2 Limitations and Future Work

Admittedly, such an ambitious attempt presented by any kind of a universal integralism that seeks to overcome relativistic stances faces serious theoretical, methodological, and practical challenges that restricts its own range. This also means that the cognitive-developmental approach to knowledge organization proposed by this study is limited in several ways. In general, critical reflections on its limitations can be related to two different functional aspects. One aspect refers to the conception and modeling of Integrative Levels of Knowing and the other aspect refers to its application to the field of knowledge organization.

Limitations regarding the *aspect of conception and modeling* are related to already existing rational reconstructions of Integrative Levels of Knowing that can be found outside the field of knowledge organization or the discipline of library and information science in general. Its most important limitations can be summarized as follows. First, there are several research traditions and disciplinary approaches involved in theorizing on developmental-logical conceptions of cognitive growth. This often implies a divergent use of terminology based on different theoretical or metatheoretical foundations, which may limit the interoperability or connectivity of these conceptions to one another. Second, all rational reconstructions or ILK models, like other types of knowledge, have only hypothetical status since they might rest on a non-representational choice of examples or they might overgeneralize individual cases (Habermas 1990). Thus, rational reconstructions need further corroboration and tend to witness some modifications or differentiations over time, as is the case for Kohlberg's (1976; Kohlberg, Levine, and Hewer 1983) model on moral development and Cook-Greuter's (2010a) model on self-development, among

others. Third, even though rational reconstructions are not directly derived from empirical data they need to be tested against empirical evidence but the ILK models presented in this study have very different degrees of such an empirical backup. For example, while models on logico-mathematical development (Dasen and Ribaupierre 1987; Molitor and Hui-Chin Hsu 2011; Lourenço 2015), moral development (Kohlberg, Levine, and Hewer 1983; Gibbs et al. 2007), or ego-identity development (Cook-Greuter 2010a) are empirically well tested, models of faith development (Fowler and Dell 2006) or aesthetic development (Parsons 1987) are based on much weaker grounds. This limitation of empirical data may call into question the cross-cultural and differential (e.g., across sexes, ages, tasks) validity of these models. Fourth, models of collective development are much harder to test empirically and often need to be guided by models of individual development. This may lead to premature assumptions of a supposed parallelism or to incorrect applications of ontogenetic stage descriptions to historiogenetic developments. For example, Gablik's (1979; see also Appendix C: Table C.8) model of spatial representation in pictorial arts misleadingly describes the increasing image-based iconic competence in art history in terms of individual development beginning at the stage of action-based sensorimotor or enactive representation. The other way around, Wynn's (1985; see also Appendix C: Table: C.21) model of spatial cognition in stone-tool technology misleadingly describes the increasing sensorimotor competence during the shift from Oldowan culture to Acheulean culture in terms of the individual development from preoperational to operational concepts of space (cp. Klix 1993). Fifth, the possibility to correlate ILK models across domains is limited to some extent since there is no one-to-one relation, even though there may exist structural isomorphisms based on some domain-general competences like Selman's (1980) capacity of perspective-taking. For this reason, some correlations of ILK models in Appendix D might be slightly different, such as the treatment of Commons's cross-paradigmatic stage in relation to Loevinger's or Cook-Greuter's stages of ego-identity development (see Appendix D:

Tables D.3, D.12, D.16, D.20). And sixth, rational reconstructions in the proper sense are limited in that they cannot be applied to so-called postrational, postrepresentational, or transpersonal stages that are thus often contested among researchers. From a methodological point of view, it is worth noting that researchers by themselves think according to certain levels of knowing, which implies a kind of "double hermeneutic" (Korthals 1997, 56). This means that the interpretation of a given level of knowing as manifested in documents or communicative actions depends itself on the interpreter's underlying frame of reference or level of knowing (Stein 2010; cp. Appendix B: Table B.41). For the present study, this implies that the status of postrational, postrepresentational, or transpersonal stages cannot be adequately evaluated since the author of this dissertation freely admits that these level descriptions do not consonant significantly with personal experiences. This may indicate that such frames of reference indeed present higher levels of knowing or more advanced levels of justification compared to that underlying this investigation and thus remain largely incomprehensible yet.

Limitations regarding the *aspect of application* are related to the use of models of Integrative Levels of Knowing as tools for knowledge organization and its most important restrictions can be summarized as follows. First, for the comparison and evaluation of different KOSs in their cognitive, cultural, and historical environments, ILK models provide rather basic analytical distinctions. These may be too poor in detail for in-depth analyses that are more interested in the peculiarities of different epistemic contexts which are often related to the same level of knowing. Second, as an organizing principle for KOSs, ILK models simply offer one way besides many others to classify perspectives and their emphasis on long-term developmental stages may often be less significant for the purpose of a given multi-perspective KOS. Third, the application of ILK models in KO practice requires a deep understanding of the significant features of distinct stages or levels of knowing and probably more background knowledge than can be provided by summarized descriptions in tables as presented in Appendix B and Appendix C.

Consequently, the application of ILK models in document indexing demands a rather high training effort for classificationists or indexers. Fourth, the analysis and indexing of authorial perspectives in terms of Integrative Levels of Knowing is for practical reasons alone limited to small document collections and it appears to be rather unlikely that this becomes a significant part of common KO practice. And fifth, the hierarchical structure of ILK models may lead to reservations within the KO discourse community due to potential misconceptions that may assume a value ranking and a pejorative use of language in that lower levels are connotated as being less valuable.

Keeping these limitations in mind, the proposed cognitive-developmental approach to knowledge organization contributes to KO research in the form of a novel theoretical and methodological foundation that offers additional analytical tools and principles of organization. Two of the most promising fields of application are addressed by the present study, namely, the cross-cultural comparison of knowledge organization systems and the classification of authorial perspectives for document indexing. Beyond the presented case studies, there are further promising fields of application that can be addressed in future. For example, the organizing principles of Integral Methodological Pluralism and Integrative Levels of Knowing can be applied to other existing classifications or to other kinds of documentary languages, particularly, to formal ontologies that contribute to the semantic web. Furthermore, classifications of epistemic contexts based on IMP and ILK may not only function as means for information retrieval but also as general orienting guides that appear to be particular relevant for domains like education (Stein 2019), business organization (Laloux 2014), politics (McIntosh 2020), and religious studies (DiPerna 2018), among others. A promising point of departure can be the visualization of "epistemological profiles" (Bachelard 1968, 39) or "conceptual profiles" (Mortimer et al. 2014, 3) of the multiple perspectives that are involved in social discourses and personal thinking. For memory institutions, it might be worth to explore to what extent the notion of Integrative Levels

of Knowing can be used for chronological or, more precisely, developmental-logical presentations of cultural heritage artifacts or documents in analogy, for example, to the influential three-age system of Stone Age—Bronze Age—Iron Age invented by Christian J. Thomsen in the 19th century for the later National Museum of Denmark (Smith 2019). In this regard, Wilber (2006, 260) proposes the idea to create a kind of dictionary or "GigaGlossary" that lists known phenomena or concepts according to the particular levels of knowing that are required to *see* or adequately understand them. This may also help to identify the multi-leveled structure of historical works, such as the *Rig Veda*, the Homeric epics, or the Christian Bible (Barnes 2000; Bammé 2011; see also Appendix E: Table E.1). Regarding information systems in general, the consideration of the epistemological dimension should not be limited to the context of production or the author's perspectives and the context of mediation or the information professionals's perspectives but also include the context of consumption or the users's perspectives in terms of levels of interpretation and understanding (Kreft 1977). For example, Jihee Beak (2014) uses cognitive-developmental models for the analysis of particular user groups, such as children of different ages in order to establish a more user-centric indexing language and a customized presentation of library collections. This can be related to Gnoli's (2020, 29) proposal of an additional dimension of knowledge organization, the θ dimension of cognition, concerned with human skills like browsing abilities that affect "the way people express their needs and interact with collections." For library and information science, the notion of Integrative Levels of Knowing may also help to better understand some dysfunctional aspects of knowledge exchange or information interaction, such as "'cross-level' miscommunications" (Wilber 2013, 11) and misinformation due to the raise of inadequate validity claims. Finally, the present study may encourage future attempts to cope with the challenge of a multi-perspective knowledge organization by demonstrating the possibility that even contexts can be contextualized in a systematic way.

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Note for the Appendix:

The samples of conceptions and models of Integrative Levels of Knowing (ILK) are limited to approaches presenting a developmental-logical conception of cognitive growth and to a historical period starting with the 20th century. The quotations in Appendix A are presented in chronological order of the dates of the first publication, while the tables in Appendices B–D are presented in alphabetical order of the names of the authors.

The term *level* is used interchangeably with other notions from the original sources, such as *stage*, *structure*, *mode*, *form*, *order*, *wave*, and *altitude*. The level sequences present reconstructions of the context-independent logic of development regardless of the context-dependent dynamics of development. This means that all temporal specifications in terms of individual ages or historical periods are only approximate indicators for the typical but not necessary appearance of a particular level of knowing.

The numberings of levels are my addition and may differ from those in the original sources. A level number, however, indicates only the relative status of a level within the sequence of a given model and cannot be compared with level numbers of other models, except in Appendix D where level numbers serve as reference points for the correlation of ILK models. All emphases in italics are taken over from the original sources but underlines are my additions, M.K.

Appendix A Conceptions of Integrative Levels of Knowing

Baldwin, James M. (1906, 38):

> "If both the logical and the pre-logical are modes or stages of cognition, then the transition from one to the other is in its nature but the development of a continuous function. Whatever new-seeming factors and elements may appear whereby we finally identify a process or a result as logical, we may still say that the continuity of the larger movement, in virtue of which both the before and the after-stages are cognitive, is unbroken, and the new factors and elements are to be constructed as determining conditions or ingredients in the constitution of the end-states which it is the function of cognition to realize."

Dilthey, Wilhelm ([1910] 2002, 149):

> "Knowledge constitutes a hierarchy of functions: the given is explicated in elementary logical functions, it is reproduced in mental representations, and it is logically represented in discursive thought—the given is thus subjected to various kinds of re-presentation."

Wundt, Wilhelm ([1912] 1916, 513):

> "Thus, that which is in a high degree characteristic of world religion is true also of world history. Within the conscious horizon of each individual very different levels of historical consciousness are represented, even in the case of the cultural peoples who participate more or less actively in the course of world history. Here, as in world religion, we find that what was developed in a sequence during the course of ages continues to remain, at any rate roughly speaking, in juxtaposition."

Cassirer, Ernst ([1923] 1955a, 303):

> "For epistemological inquiry an unbroken path leads from sensation to intuition, from intuition to conceptual thought, and thence to logical judgment. Yet in following this path, the epistemologist is aware that sharply as its phases must be distinguished in reflection, they must never be regarded as independent data of consciousness, existing separately from one another. On the contrary, every more complex factor here includes the simpler ones, and every 'later' one the 'earlier', while conversely the latter contains within it the seeds of the former."

Lloyd Morgan, Conwy (1923, 17):

> "The evolutionary genesis of contemplative thought involves that which has already been developed at the lower level of naive perception; and the genesis of such

perception involves, as historically prior, sensory presentation."

Scheler, Max ([1924] 2013, 39, 195n10):

> "The developmental phase-law, on the other hand, is an *essential law* of the transition from stage to stage, in such a way that the peculiar factual beginning and ending of the development remains variable. It controls all *possible* factual development. [...] [T]he actual 'situations', the 'statics', present themselves as the result, as the relative momentary representation, of the dynamics, that is, as stratification of older and newer power-effects (every concrete culture is stratification)."

Mannheim, Karl ([1924/25] 1982, 264):

> "Although the encroaching civilizational way of knowing increasingly drives these mythical and magical elements out of everyday practical knowledge, mythical and magical components do nevertheless survive in our everyday knowledge of life even today. [...] The consciousness of the individual, then, may be likened to a petrification of past ages in the history of consciousness, and just as geology can reconstruct the history of the earth' crust, so the career of consciousness is preserved in stratified layers in the make-up of the individual consciousness of the present."

Vygotsky, Lev S. ([1934] 1986, 140):

> "It would be erroneous, however, to imagine that this transition from complexes to concepts is a mechanical process in which the higher developmental stage completely supersedes the lower one. The developmental scene turns out to be much more complex. Different genetic forms coexist in thinking, just as different rock formations coexists in the earth's crust."

Needham, Joseph (1937, 49):

> "Every transition from the unconscious to the conscious implies a step from bondage to freedom, from lower to higher level of organization. All early agriculture and storage of food-products necessitated more conscious control than before. Increases in the efficiency of mechanisms of transport from horse to the aeroplane widened men's conscious horizon."

Bachelard, Gaston ([1940] 1968, 17, 117):

> "There is no end to the dispute about moral progress, social progress, poetic progress or the progress of happiness, but there is one form of progress which is beyond argument and that is scientific progress, as soon as it comes to be judged in the hierarchy of

> knowledge and in its specifically intellectual aspects. We are therefore going to take the direction of this progress as the axis of our philosophic study and if, on the abscissa of its development, philosophical systems place themselves regularly in an order constant for all notions, an order which moves from animism to surrationalism (via realism, positivism and simple rationalism) we shall be somewhat justified in speaking of a philosophical progress of scientific notions. [...] Indeed, the whole impetus of scientific thought for a century now stems from dialectical generalizations of this sort, which embrace what has been denied."

Hartmann, Nicolai ([1942] 1953, 46):

> "Thereby consciousness liberates itself from subservience to vitality and becomes a spiritual consciousness. It thus enters into a certain contrast with that primary consciousness which is determined by instinctive life and harnessed to its service. The latter may be called 'spiritless consciousness.' It is not extinguished in the fully developed human being but persists in the background of his spiritual consciousness. Occasionally it may break forth all of a sudden, perverting the objective order of the spirit. In the young child this spiritless consciousness is the dominant one, just as it is in the higher animals, and there is little doubt that through long periods of man's prehistoric development his consciousness was predominantly a spiritless one."

Dewey, John and Bentley, Arthur F. (1949, 107):

> "With this much of introductory display let us now set down in broad outlines three levels of the organization and presentation of inquiry in the order of their historical appearance, understanding, however, as is the way with evolutions generally, that something of the old and often much of it, survives within or alongside the new. We name these three levels, those of Self-Action, Interaction, and Transaction. These levels are all human behaviors in and with respect to the world, and they are all presentations of the world itself as men report it."

Gebser, Jean ([1949] 1985, 42):

> "In order to achieve the requisite basis for transformation to which we have alluded, we wish to present as a working hypothesis the four, respectively five, structures we have designated as the archaic, magical, mythical, mental, and integral. *We must first of all remain cognizant that these structures are not merely past, but are in fact still present in more or less latent and acute form in each one of us*."

Piaget, Jean ([1955] 1977, 815):

> "The *integrative character of stages*: the structures constructed at a given age become an integral part of the structures of the following age. For example, the permanent object that is constructed at the sensorimotor level will be an integral element in notions of conservation formed later (when there will be conservation of an ensemble, or of a collection, or of an object undergoing deformation in its spatial appearance). In the same way, the operations that we call concrete will constitute an integral part of formal operation, in the sense that the latter will constitute a new structure but resting on the former, which are thus treated as their contents (formal operations thus constituting operations effectuated upon other operations)."

Steward, Julian H. ([1955] 1972, 51):

> "The utility of distinguishing levels of sociocultural integration as well as categories of phenomena can be strikingly illustrated in studies of cultural change and acculturation. In the growth continuum of any culture, there is a succession of organizational types which are not only increasingly complex but which represent new emergent forms. The concept is fairly similar to that of organizational levels in biology. In culture, simple forms, such as those represented by the family or band, do not wholly disappear when a more complex stage of development is reached, nor do they merely survive fossil-like, as the concepts of folkways and mores formerly assumed. They gradually become modified as specialized, dependent parts of new kinds of total configurations."

Werner, Heinz and Kaplan, Bernard (1956, 866):

> "The developmental psychology of cognition postulates one regulative principle of development, the following orthogenetic principle: wherever development occurs, it proceeds from a state of relative lack of differentiation to a state of increasing differentiation, articulation, and hierarchic integration."

Sahlin, Marshall D. and Service, Elman R. ([1960] 1988, 35–36):

> "As in life, thermodynamic achievement has its organizational counterpart, higher levels of integration. Cultures that transform more energy have more parts and subsystems, more specializations of parts, and more effective means of integration of the whole. Organizational symptoms of general progress include the proliferation of material

> elements, geographic increase in the division of labor, multiplication of social groups and subgroups, and the emergence of special means of integration: political, such as chieftainship and the state, and philosophical, such as universal ethical religions and science."

Perry, William G. (1968, 2):

> "A person moving from the assumptions of student A to those of student B to those of student C may therefore be said to be involved in a development, not simply because his assumptions become 'better' or more 'true'—which is another question—but because the forms of his later assumptions subtend those of his earlier assumptions in a coherent manner, as cannot be said in reverse."

Lorenz, Konrad ([1973] 1978, 245):

> "There are in my view definite signs that a self-recognition of all cultural humanity, a collective self-knowledge derived from natural science, is beginning to spring up. If, as is entirely possible, this movement grows, the intellectual aspirations and energies of mankind will be raised to a higher level of integration, as in the distant past the 'creative flash' or reflection and meditation raised man's power of understanding to a new and higher level."

Luria, Alexander R. ([1974] 1976, 161–62):

> "Our investigations, which were conducted under unique and non-replicable conditions involving a transition to collectivized forms of labor and cultural revolution, showed that, as the basic forms of activity change, as literacy is mastered, and a new stage of social and historical practice is reached, major shifts occur in human mental activity. These are not limited simply to an expanding of man's horizons, but involve the creation of new motives for action and radically affect the structure of cognitive processes. [...] In addition to elementary graphic-functional motives, we see the creation of new motives that take shape in the process of collectivized labor, the joint planning of labor activity, and basic schooling."

Bruner, Jerome S. (1974, 327–28):

> "I shall call the three modes of representation mentioned earlier enactive representation, iconic representation, and symbolic representation. Their appearance in the life of the child is in that order, each depending upon the previous one for its development, yet all of them remaining more or less intact

throughout life—barring such early accidents as blindness or deafness or cortical injury."

Habermas, Jürgen ([1976] 1979, 184–85):

> "Thus, by *levels of justification* I mean formal conditions for the acceptability of grounds or reasons, conditions that lend to legitimations their efficacy, their power to produce consensus and shape motives. These levels can be ordered hierarchically. The legitimations of a superseded stage, no matter what their content, are depreciated with the transition to the next higher stage; it is not this or that reason which is no longer convincing but the *kind* of reason. Such depreciation of the legitimation potential of entire blocks of tradition occurred in civilizations with the retrenchment of mythological thought, and in modern times with the retrenchment of cosmological, religious, and ontological modes of thought."

Kohlberg, Lawrence and Hersh, Richard H. (1977, 54):

> "1. Stages are 'structured wholes,' or organized systems of thought. This means individuals are consistent in their level of moral judgment.
>
> 2. Stages form an invariant sequence. Under *all* conditions except extreme trauma, movement is always forward, never backward. Individuals never skip stages, and movement is always *to the next stage* up. This is true in *all* cultures.
>
> 3. Stages are 'hierarchical integrations.' Thinking *at a* higher stage includes or comprehends within it lower stage thinking. There is a tendency *to function at or prefer the* highest stage available."

Leontiev, Aleksei N. ([1977] 2009, 190–91):

> "If, in the initial steps of the child's psychological development, his biological adaptations (which make a decisive contribution to establishing his perceptions and emotions) appear at the first plane, then subsequently these adaptations are transformed. This of course does not mean that they simply stop functioning; it means something else, specifically that they begin to realize another higher level of activity on which the amount they contribute at each given stage of development depends."

Apel, Karl-Otto (1978, 10):

> "Thus my conception of a revolutionary succession of different paradigms of thought differs from that of Th. Kuhn in that it implies some sort of a Hegelian idea of possible progress in the history of human thought.

> Properly speaking, it does not imply any claim of a causally explicable and hence predictable necessity of progress. Rather, it implies the claim that the three paradigms of First Philosophy make up a hierarchical order of levels of critical reflection and also make up an order of necessary succession in the teleological sense without providing any guarantee of its being realized in advance of the facts of history."

Gablik, Suzi (1979, 71):

> "The fact that all these levels are conserved at the same time as they are superseded is what gives history its integrative character and its continuity. A content that has been used on one level with respect to a certain kind of structure can be transposed onto another, by being reconstructed in a new way of thinking. The resulting pattern appears as a succession of repeated differentiations, specializations and reintegrations, with a distinct progression from simple intuition to more complex logical and rational structures."

Jantsch, Erich ([1979] 1980, 296):

> "The conclusion may be drawn that it is not individual levels which impart depth or height (both terms seem to express the same notion here!), but the multilevel vibrations of many levels of consciousness. A new level does not mean an 'ascent' but an enrichment of the ensemble of possibilities of expression and the dimensions of its autonomy."

Fischer, Kurt (1980, 485):

> "The skills at each level are characterized by a structure that indicates the kinds of behaviors that the person can control at that level. Also, at each level, the skills include all the lower levels."

Selman, Robert L. (1980, 36):

> "We tried to construct the levels such that they both described and were defined by genuine universal development in both the hierarchical sense, in which higher levels are built on lower ones, and the structural or reorganizational sense, in which at each higher level a new operational principle takes command. Out of this process emerged a system of five levels of social perspective taking or coordination."

Döbert, Rainer (1981, 77):

> "The very possibility of regressing to a former mode of thinking arises from the medium of information transmission itself. It is an essential characteristic of meaning that the fixation of a given meaning does not destroy other meaningful possibilities. A given meaning is always embedded in a horizon of

> more and possibly different meanings. And to this horizon belong even former levels of the socio-cultural tradition. Usually we do not think any more in terms of a teleological world view, but we *can* very well understand and think in terms of such an orientation system, under specific conditions we may 'regress' to such a mode of thinking. We may believe that this way of thinking is wrong, but it is for us not totally inaccessible."

Fowler, James W. (1981, 99–100):

> "Moreover, we believe that faith stages meet the structural-developmental criteria for stages. They provide generalizable, formal descriptions of integrated sets of operations of knowing and valuing. These stagelike positions are related in a sequence we believe to be invariant. Each new stage integrates and carries forward the operations of all the previous stages."

Zwilgmeyer, Franz (1981, 31 [my translation, M.K.]):

> "If today's human being is ready to put aside his possible sharp ego control in favor of sinking into a feeling-relevant image, he experiences that for him magic is quite possible again since the fundamental psychological structures are still alive in him and merely overlaid."

Gilligan, Carol (1982, 105):

> "This construction was traced through a sequence of three perspectives, each perspective presenting a more complex understanding of the relationship between self and other and each transition involving a critical reinterpretation of the conflict between selfishness and responsibility. The sequence of women's moral judgment proceeds from an initial concern with survival to a focus on goodness and finally to a reflective understanding of care as the most adequate guide to the resolution of conflicts in human relationships."

Kegan, Robert (1982, 85 [quoted without references, M.K.]):

> "It has been called a process of decentration, emergence from embeddedness, the recurring triumph over egocentrism; it has been referred to as a process in which the whole becomes a part to a new whole; in which what was structure becomes content on behalf of a new structure; in which what was ultimate becomes preliminary on behalf of a new ultimacy; in which what was immediate gets mediate to a new immediacy. All these descriptions speak to the same process, which is essentially that of adaptation, a differentiation from that which was the very subject of my personal

organization and which becomes thereby the object of a new organization on behalf of a new subjectivity that coordinates it."

Turiel, Elliot (1983, 19):

> "Development is continually directed toward increasing equilibrium, so that each stage is a more equilibrated state than the previous one. Equilibrium, however, does not simply mean adjustment of conformity to external pressures. There are two interrelated aspects to structural equilibrium. One refers to the equilibrium or coherence of a system of thinking. The second refers to an understanding of the environment in the most powerful, comprehensive, and effective way. That is, each stage of development represents a more equilibrated means of understanding the environment than the previous stage."

Armon, Cheryl (1984, 362):

> "*Hierarchical integration*: Theoretical analysis should reveal that each stage of the Good includes the one before it, not by adding new content, but by transforming the previous stage into a more highly integrated and differentiated structure."

Basseches, Michael A. (1984, 256):

> "The context-free strategies of postformal reasoning may be hierarchically more sophisticated than those of formal reasoning, which they also include. For example, postformal reasoning may involve the ability to form third-order relationships. Third-order relationships may be necessary to establish isomorphisms between one context-specific research program and another."

Koplowitz, Herb (1984, 276):

> "Formal operations are considered to succeed concrete operations for several reasons. First, formal-operational thinking appears later in an individual's development than does concrete-operational thought. Second, a person capable of formal-operational thought is also capable of concrete-operational thought. In addition, the transition to formal operations follows two trends that are apparent throughout development. First, later concepts are more flexible than earlier ones, that is, they can be usefully applied in a greater variety of situations. Second, earlier cognitive structures are special cases or simplified versions of the structures that replace them."

Labouvie-Vief, Gisela (1984, 170 [quoted without symbol notation in parantheses, M.K.]):

> "From level to level, the individual not only functions at the new, stage-appropriate mode, but also previous modes (sensori-motor, symbolic, and so on) become more structurally reorganized. At the first level, the equilibrated 'self' is defined as sensori-motor regulations. At the second level, the 'self' is defined by symbolic regulations that superordinate (for example, selectively facilitate and inhibit) reflected sensori-motor ones. In the same fashion, intrasystematic, intersystematic, and autonomous regulations come to eventually superordinate previous modes of functioning."

Stern, Daniel N. ([1985] 1998, 32):

> "In fact, each successive organizing subjective perspective requires the preceding one as a precursor. Once formed, the domains remain forever as distinct forms of experiencing social life and self. None are lost to adult experience. Each simply gets more elaborated."

Campbell, Robert L. and Bickhard, Mark H. (1986, XI–XII):

> "The potentialities of properties which may implicitly present at one level of knowing becoming explicitly known from the next higher level iterates unboundedly, generating the primary knowing levels hierarchy. This hierarchy, in turn, generates the corresponding knowing levels developmental stage model: no system at a given knowing level can be constructed, can develop, unless there are already existing systems at all lower knowing levels supporting it. Development through the knowing levels, then, must proceed in a strict stage sequence."

Kilga, Bernhard (1986, 12–13 [my translation from German, M.K.]):

> "In the outlined view of historical and social events, a deep history of a kind of archeology and geology of mental processes is designed, which uncovers and examines the strata of psychological human conditions that lie beneath the surface of the general history of events. [...] The individual strata, however, are not to be understood as separate from each other and independently. Rather, they form a unity in human experience."

Elias, Norbert ([1987] 2001, 103):

> "[P]eople are in a position to know that they know; they are able to think about their own thinking and to observe themselves observing. Under certain circumstances they can climb further and become aware of themselves as knowing that they are aware of

themselves knowing. In other words, they are able to climb the spiral staircase of consciousness from one floor with its specific view to a higher floor with its view and, looking down, to see themselves standing at the same time on other levels of the staircase. Moreover, the perspective characteristic of these other levels is assimilated into their own in one form or another, although its characteristics are not the same for people who take it for granted as for those who are able to view it with a certain detachment from a higher level of consciousness. How far up or down one climbs this staircase depends not only on the talent, personality structure or intelligence of individual people, but on the state of development and the total situation of the society to which they belong."

Parsons, Michael J. (1987, 20–21):

> "There are two ways in which one may think of a stage as being more adequate than the previous one. The first is aesthetic. Each stage understands paintings more adequately than before. The account of changing understandings of each topic is therefore also an account of their increasing adequacy, stage by stage. [...] The second kind of adequacy is psychological. The stages rest on our increasing ability to take the perspective of others, the common dimension of cognitive developmental schemes."

Damon, William and Hart, Daniel (1988, 57–58):

> "It is important to note that, in a hierarchical model such as this one, the earlier levels become part of the later ones, though in somewhat new form. Thus, for example, self-understanding of the 'me' is always categorical, as at Level 1; but later levels employ the categorical mode for new purposes. Thus, earlier forms of self-understanding neither disappear nor are retained per se. Rather they continue to function in transformed state as part of later forms."

Kramer, Deidre A. (1989, 156–57):

> "The major principle of cognitive change in the present model is that of the orthogenetic principle, that is, that all development proceeds from a state of relative undifferentiation toward that of differentiation, and finally hierarchical integration. [...] Such a model allows for a unified conception of life-span development, where thought is reconstructed at each level, with each new level providing greater inclusiveness and (at the integrated level) coherence than the previous level."

LePan, Don (1989, 20–21):

> "Once again, what distinguishes the characteristic mode of thought of modern developed societies from those of primitive societies is not the *absence* of primitive processes in the Western mind, but the *presence* of additional modes of causal, temporal and logical thought."

Alexander, Charles et al. (1990, 294):

> "We propose that these levels of the mind form a natural hierarchy of 'processes of knowing,' with the forms (patterns) of thought and action strongly influenced and delimited by the most abstract structure of knowing functionally available to conscious awareness during each period. […] our model is hierarchical, since, in an invariant sequence, increasingly abstract (subtle) levels serve as the primary locus of awareness and coordinate the less refined levels."

Oser, Fritz and Gmünder, Paul (1991, 63):

> "The religious development of persons does not happen slowly and steadily, but in steps. The passage from one step to the next is complicated and constitutes, in any case, a discontinuity. This sort of movement is usually designed as phases or stages. The formal qualities which describe the individual stages are: qualitative differentiation, sequentiality, holism, and the incorporation of lower stages into higher ones."

Biggs, John B. (1992, 35):

> "The way the same task is handled at various periods reveals qualitative differences, or discontinuities, between stages. [...] The later developing, more abstract modes do not replace earlier ones but coexist with them. The latest to develop simple represent a current ceiling to abstraction, not a standard to which all current performances must conform."

Elgin, Duane (1993, 26):

> "Said another way, each new dimension provides a unique 'opportunity space' or learning context for people and societies to fill out with their actions. The dimensional nature of reality is like a nested set of Chinese boxes: Each new dimension embodies an enlarged frame of reference within which are nested all previous dimensions."

King, Patricia M. and Kitchener, Karen S. (1994, 13):

> "This developmental progression in reasoning is described by seven distinct sets of assumptions about knowledge and how knowledge is acquired. Each set of

> assumptions has its own logical coherency and is called a stage. Each successive stage is posited to represent a more complex and effective form of justification, providing more inclusive and better integrated assumptions for evaluating and defending a point of view."

Schlagel, Richard H. (1995, 1):

> "Seen from this point of view, the growth of scientific knowledge represents a gradual, if at times interrupted and irregular, progression toward a more objective and comprehensive understanding of the universe. But while this position is commonly accepted, little afford has been made to justify it in terms of an actual study of the growth of a higher level of abstract thought, that of scientific rationalism, from an earlier form of concrete objectivity. [...] What is still lacking, however, is an interpretation of these various segments from the perspective of an overall continuity, viewing them as a gradual process of intellectual growth (including normal progressions, lapses, crises and revolutions), rather than as separate, independent stages."

Wilber, Ken ([1995] 2000, 118–19):

> "The important point, for now, is simply that each new and emergent interior holon transcends but includes, and thus *operates upon*, the information presented by its junior holons, and thus it fashions something *novel* in the ongoing cognitive or interior stream. Hence, each new growth in consciousness is not just a 'discovery' of more of a pregiven world, but the co-creation of new worlds themselves, what Popper calls a 'making and matching' of new epistemological domains, a discovery/creation of higher and wider worlds."

Beck, Don E. and Cowan, Christopher C. (1996, 40, 62):

> "A vMEME [value meme, M.K.] transposes itself into a world *view*, a value *system*, a *level* of psychological existence, a believe *structure*, organizing *principle*, a *way* of thinking, and a *mode* of living. [...] Although each new vMEME builds on the foundation of those which came before and adds new factors of complexity, the pattern of vMEMEs' emergence does not blindly follow a predetermined script in a mechanistic, step-by-step fashion."

Thompson, William I. (1996, 38):

> "If we look back at this evolutionary process of emergent states in the movement from forms, feelings, perceptions, and dispositional attitudes to consciousness, we should be able to construct a dynamical

model or phase-portrait for the geometry of behavior. We could construct a five-dimensional model for consciousness with each channel of information coming in defined as a dimension or axis."

Wade, Jenny (1996, 267–68):

"Higher stages of consciousness comprehend lower stages but the reverse is not true. [...] [P]eople operating at lower stages have no way to judge higher stages except by comparison with lower stages because they cannot comprehend higher-stage dynamics. They tend to equate them with more regressive stages, not more progressive ones.

Deacon, Terrance (1997, 449):

"If consciousness is inevitably representational, then it follows that a change in the nature of the way information gets represented inevitably constitutes a change in consciousness. Consciousness of iconic representations should differ from consciousness of indexical representations, and this in turn should differ from consciousness of symbolic representations. Moreover, since these modes of representation are not alternatives at the same level but hierarchically and componentially related to one another, this must also be true of these modes of consciousness as well. They form a nested hierarchy, where certain conditions in the lower levels of consciousness are prerequisite to the emergence of consciousness at each higher level."

Egan, Kieran (1997, 4):

"My primary aim in this book is to unravel some of the major strands or layers of our typically polysemous understanding. I try to separate out a set of general and distinctive kinds of understanding and characterize each of them in detail; I distinguish five, which I call Somatic, Mythic, Romantic, Philosophic, and Ironic. I try to show, furthermore, that these kinds of understanding have developed in evolution and cultural history in a particular sequence, coalescing to a large extent (but not completely) as each successive kind has emerged. The modern mind thus is represented as a composite."

Commons, Michael et al. (1998, 240):

"The General Model of Hierarchical Complexity uses the hierarchical complexity of tasks as the basis for the definition of stage. An action is at a given *stage* when it successfully completes a task of a given hierarchical order of complexity. Roughly, *hierarchical complexity* refers to the number of nonrepeating recursions that the coordinating actions must perform on a set of

primary elements. Actions at a *higher order of hierarchical complexity:* (a) are *defined* in terms of the actions at the *next lower* order of hierarchical complexity; (b) *organize* and *transform* the lower order actions; (c) produce organizations of lower order actions that are new and *not arbitrary* and cannot be accomplished by those lower order actions alone."

Loevinger, Jane (1998, 37):

"A final line of evidence for sequentiality is asymmetry of comprehension, that is, people can understand thinking at their own level or at levels below their own, but not at levels above their own."

Sinnott, Jan D. (1998, 62–63):

"One important characteristic of the idea presented here is that any social or interpersonal behavior can be filtered or encoded in terms of any level of thought. An event can be assimilated at any level of knowing. But at each increasingly sophisticated level of knowing, more complex aspects of the event can be organized and handled by the knower."

Cook-Greuter, Susanne R. ([1999] 2010, 19–20):

"On the whole, developmental stage theories based on Piaget's ideas describe human development as a sequence of increasingly complex and integrated stages or coherent systems of meaning making. Each stage constitutes a different way of how people know reality, in other words, a different epistemology, or a different world-view. Central to this model is the claim that the stage sequence is unidirectional and that the stages constitute hierarchical integrations. [...] A new stage integrates the material or content of the previous one as a special case, that is, as an element into its more inclusive meaning system. Each stage is thus a part/whole. It is a whole in its own right, as well as part of a bigger, more expansive system of understanding."

Damerow, Peter (1999, 20–21):

"The execution of symbolic actions with the symbols of the abstract concept, instead of only mentally performing the operations (for example, working with an arithmetic algorithm), objectifies the mental activity and so again initiates the construction of meta-cognitive operations in the same way as the original first-order representation initiated the construction of the abstract concept, which is now embodied by the second-order representation. Any process of development of the logico-mathematical thought may thus be interpreted as an iteration and recombination of such reflective abstractions

that are initiated by culturally transmitted representations."

Parker, Sue T. and McKinney, Michael L. (1999, VII):

"This analysis shows that the stages of human cognitive development recapitulate the stages of cognitive evolution in a series of ancestors, who evolved new stages of cognitive development through terminal extension of previous stages, a form of heterochrony known as *peramorphosis* or adultification."

Barnes, Michael H. (2000, 45):

"Piaget's description of stages helps to *categorize* thought styles more clearly. His theory also helps to recognize the particular *sequence* in which stages of thought appear in cultural history. In cultures as in individuals, the easier modes of thought appear first and continue to be used even when more difficult modes of thought are added."

Dux, Günter ([2000] 2011, 118):

"The more clearly the development of all history comes into view, the greater the contrasts that become evident between past societies and ours, the more urgent the question why people acted and thought in early societies differently from their counterparts in later societies, and why these later societies were able to develop out of earlier ones. [...] The most encompassing condition of development of each and every society, however, is the structure of the society that precedes it, out of which the new one has developed."

Donald, Merlin (2001, 262):

"Thus modern culture contains within it a trace of each of our previous stages of cognitive evolution. It still rests on the same old primate brain capacity for episodic or event knowledge. But it has three additional, uniquely human layers: a mimetic layer, an oral-linguistic layer, and an external-symbolic layer. The minds of individuals reflect these three ways of representing reality."

Torbert, Bill R. et al. (2003, 68):

"*First*, each successive action-logic we describe includes all the possibilities of the prior action-logics and a whole new set of alternatives as well. Thus, at each later action-logic we have more degrees of freedom about which action-logic we use when."

Robinson, R J. (2004, 253–54):

> "It is certainly the case that there are stages in the development of intelligence, each revealing a different *kind* of reasoning. [...] The relationship between stages is that each is equivalent to its predecessors, but operates on a higher level [...]. As such, a new stage *does* essentially the same things as its predecessors, but does them on a higher plane. In particular, each new stage both overcomes the omissions, conflicts and contradictions to which previous stages were subject and opens up new potential of which all previous stages were oblivious."

Overton, Willis F. (2006, 25–26):

> "All nonlinear dynamic systems, including the human psyche, undergo transformational change. Transformational change results in the *emergence of novelty*. As forms change, they become increasingly complex. This increased complexity is a complexity of pattern rather than a linear additive complexity of elements."

Hallpike, Christopher R. (2008, 123–24):

> "The human mind is not like an empty bucket that is gradually filled with information by adults, or by passively observing the world around one; each individual has *actively* to construct his understanding of the world, of things and of people, by interacting and experimenting with himself. [...] Some ways of thinking are more elementary than others, and provide the foundation on which the more advanced and complex types of thought can be constructed, when the social conditions are right."

Combs, Allan (2009, 89):

> "If we stand back and view the stages of growth charted there from infancy to adulthood, we see that one important theme that runs throughout development is a persistent increase in internal complexity which lies inside and powers the growth of the mind. This complexity presents itself in the form of increasingly sophisticated schemas and patterns of schemas all of which constitute a person's mind."

Esbjörn-Hargens, Sean and Zimmerman, Michael E. (2009, 145):

> "All shifts from one level of development to the next involve a crisis of the self. The self is letting go of old ways of interpreting and seeing the world. It is a death of an old self and a birth of a new, more inclusive self."

Bellah, Robert N. (2011, 117):

> "I offered a typology of religious representation—unitive, enactive, symbolic, and conceptual—to describe the way in which religions have understood reality. The concepts of enactive, symbolic, and conceptual representation were adapted from the work of Jerome Bruner on child development. [...] I argued that religion draws on all these forms of representation: just as the child continuous to use enactive and symbolic representations, even after becoming conceptually sophisticated, so do religions."

Laloux, Frederic (2014, 38 [square brackets added, M.K.]):

> "Every paradigm *includes and transcends* the previous. So if we have learned to operate from, say, Achievement-Orange [level 3], we still have the ability, when appropriate, to also react from Conformist-Amber [level 2] or Impulsive-Red [level 1]. Even the opposite is true to some extent: were we to be surrounded by people operating from a later stage, for example, Pluralistic-Green [level 4], we could temporarily display Green behaviors, even though we wouldn't yet have integrated this stage."

Mortimer, Eduardo F. et al. (2014, 23):

> "The development of new forms of activity gives rise to new types of thinking. Nevertheless, since earlier forms of activity continue to fulfill some role in culture, the old types of thinking employed in these earlier forms are preserved and continued to function well in their appropriate contexts."

Rochat, Philippe (2015, 123–24):

> "The model proposes that in development, layers of awareness are added in a cumulative fashion. This accumulation increases the experiential range of the child, constantly navigating through these layers while awake and conscious. [...] However, contrary to the constructionist, stage-like view á la Piaget, a new added layer does not change or re-structure other already existing layers."

Lourenço, Orlando M. (2016, 123):

> "In a *strong* conception of development, developmental stages are characterized by the following criteria: (a) *Hierarchy*: stages appear in an invariant, hierarchical order; (b) *integration*: a given stage integrates, albeit overcomes or transcends its predecessor; (c) *consolidation*: before all features that define

> a certain stage are present, there is a phase of preparation wherein the stage still presents some features of the previous one; (d) *structuration*: a stage is organized by what Piaget called *structures d' ensemble* or overarching structures, that is, a way of thinking/knowing which has some formal and logical properties and is applied to different contents; and (e) *equilibrium*: if an individual is capable of performing according to the criteria of a given stage, then s/he is at a certain degree of (unstable) equilibrium, and is not cognitively 'perturbed' when s/he has to solve problems whose solution does not require competencies that go beyond the competences linked to the stage at hand."

Pisula, Wojciech (2016, 56 [quoted without reference, M.K.]):

> "[T]he evolutionary processes that gave rise to consciousness phenomena started as long as 500 million years ago, with the emergence of vertebrates possessing midbrain. This shows that our thoughtless anthropo-centrism is detrimental to our understanding of the world also with regard to consciousness. Due to limitations of space, the present proposal omits the ontogenetic perspective. However, there are reasons to believe that its inclusion would change little in the proposed construct, although it is very likely that higher integrative levels of consciousness would see further subdivision into constituent sublevels. It seems that the theory of integrative levels can still serve as a useful tool for advancing our understanding of complex phenomena. This paper presents an attempt to employ it in the analysis of the phenomenon of consciousness."

Appendix B Models of Integrative Levels of Knowing in Individual Development

Table B.1 Integrative levels of consciousness according to Vedic psychology (Charles N. Alexander et al.).

Level	Characteristics
Prerepresentation	
1. Action and senses (sensorimotor)	The "I" or ego (knower) during this period acts on or senses (dominant process of knowing) nonpermanent objects of immediate sensation and action (known). Throughout most of this period, there is not a well-developed internal capacity to represent objects symbolically as permanent and as separate from other objects—be it a representation of the self (the "me") or any other object in the environment. Thus, the self as known is not yet clearly differentiated from the environment. The "I" or ego tends to remain identified with its current sensations or actions.
Representation	
2. Desire (early representations)	As the "I" or ego (knower) increasingly functions through simple representational processes, it comes to monitor objectively the domain of action and immediate sensation in which it was previously embedded. Actions and sensations are now internally organized through more stable perceptual-mental representations and desires, which can also be outwardly expressed in the form of speech (verbal representation). At this level, the child can represent both himself and others as permanent objects of attentions and desire (the known).
3. Mind (concrete thinking)	Emergence of the deeper, comparative aspect of the thinking mind typically occurs during the five- to seven-year shift. During this shift, the primary association of the "I" (knower) shifts from desires and simple representations to the comparative thinking level of mind (dominant process of knowing), which generates classes and relations in terms of which the known is increasingly organized. Maharishi holds that the active thinking mind is responsible for apprehending, remembering, comparing, and conceptually organizing the multiplicity of perceptions to plan speech and action to fulfill desires. We suggest that during this period awareness "steps back" out of the simple representational screen of the mind and can now actively coordinate over time and space perceptions and concrete representations. As thought becomes more fully differentiated from sensory impressions and desire, egocentric behaviors resulting from confusion between these two domains naturally subside. The accompanying capacity to entertain and compare viewpoints further contributes to the reduction of egocentrism.

(continued)

Table B.1 Integrative levels of consciousness according to Vedic psychology (Charles N. Alexander et al.).

Level	Characteristics
4. Intellect (abstract reasoning)	The role of intellect, according to Vedic psychology, is to discriminate, logically evaluate, and decide, bringing direction and order (and hence understanding) to the diverse and more outwardly oriented activity of the thinking mind. It is only when internal mental states start to be reflected upon that the question "Who am I?" can arise as something more than simply distinguishing oneself by name or external characteristics from others. From the viewpoint of Vedic psychology, the primary constraint of this period is that while the intellect enables symbolic, reflective thought, it still does not permit direct awareness of Self (self-referral). The "I" can only know itself indirectly through a series of intellectual constructions or representations about itself as the "me". This "dualism" is a universal design feature of language and symbolic representation of any kind. The symbol always stands in for or refers to something else (the referent). The limits of the intellect are further reflected in the methods of conventional science, which, while making enormous progress in gaining equal understanding and mastery over subjective existence (though with limited success)), rather than directly address it, and hence does not really answer the question, "Who am I?" which is essentially a subjective issue.
5. Feeling and intuition	According to Vedic psychology, feelings in the broad sense operate at and interconnect all levels of mind. However, they are particularly evident in the interface between mind and senses, and between the intellect and ego. In our model, during the early representational period, they function primarily as extrinsically motivated desires. At a more mature level of development, feelings function as delicate carriers of information, linking the intellect back to the intrinsic evolutionary motivation of the ego and ultimately to the inner Self. Feelings become more self-validating, and less dependent on validation through conscious intellectual analysis. Maharishi describes feeling as a more "relaxed" state of the intellect. It is flexible and relational (hence more sensitive to context and change) and involves a subtler, more rapid, holistic, intuitive mode of functioning. Mature feelings and intuition provide an internal ground for guiding the reflective intellect—increasing the likelihood of creative insight in both the sciences and humanities.
6. Ego	Vedic psychology locates the ego or bounded "I" at the subtlest level of individual functioning, closest to the silent, transcendental value of the unbounded Self. The individual ego constitutes the interface between unbounded pure consciousness—the ultimate nature of the knower—and the current process of knowing. As the active knower, the ego functions through these processes of knowing, integrating the aspects of the known into a coherent whole. Our model suggests that to the degree such personal growth occurs in adulthood, it would result from increasing differentiation or development of the ego resulting in enhanced synthesizing capacity. On this basis, information provided through all other levels of mind could be more objectively appreciated and integrated. However, even in this relatively mature state, the ego still can only know itself indirectly through feelings (and the other levels of mind) and hence remains localized and constrained by the limits of that information. According to Vedic psychology, until the unbounded value of the Self, at the basis of the ego, is realized, the individual will always remain, to some extent, unfulfilled.

(continued)

Table B.1 Integrative levels of consciousness according to Vedic psychology (Charles N. Alexander et al.).

Level	Characteristics
Postrepresentation	
7. Cosmic consciousness	According to Vedic psychology, when awareness no longer alternates between identification with the bounded ego and the underlying Self and instead becomes permanently established in the experience of pure consciousness, the first stable, higher stage of consciousness is gained. The unbounded Self, in cosmic consciousness, is classically described as "nonattached," not in the sense of being withdrawn, but because it is no longer identified with or overshadowed by the boundaries of the changing values of thought, perception, and action. When even the finest level of mind is completely transcended, consciousness assumes a unified field character allowing direct Self awareness. Thus, the primary constraint of the prior representational periods is overcome in that the question, "Who am I?" has been fully resolved. Self knowledge may now be said to be direct and complete. Knower, known, and process of knowing are unified in the unbroken, self-referral experience of pure consciousness. In terms of our life-span model, this process of differentiation of the Self culminates in what could be termed *self permanence*—stable experience of the nonchanging Self as opposed to changing representations of the bounded self.
8. Refined cosmic consciousness	Just as the process of complete differentiation of the knower or Self took place in phases, Vedic psychology posits that subsequent unification of knower and the object known occurs through stepwise development. The first major stage in integrating Self and non-Self is said to involve a profound refinement in perceptual appreciation of the subtlest values of objective reality—and hence is referred to as refined cosmic consciousness. In refined cosmic consciousness, the finest relative level is directly perceived and found to be fundamentally the same in all objects, mental or physical. Further, its essential nature is conserved even as it is expressed or transformed into specific manifestations of mind of physical creation. Perception of finer values of an object (animate or inanimate) gives rise to greater joy in and love for the object, which in turn facilitates still deeper appreciation of the object. Refined cosmic consciousness also has been referred to by Maharishi as "God consciousness," because in this state, one is said to directly perceive and intimately appreciate not only the full grandeur of all levels of creation, but also the ongoing process of creation occurring at the junction point between manifest existence and its unmanifest origin.

(continued)

Table B.1 Integrative levels of consciousness according to Vedic psychology (Charles N. Alexander et al.).

Level	Characteristics
9. Unity consciousness	According to Vedic psychology, at the highest stage of unity consciousness, "The Self, which held its identity as separate from all activity in the state of cosmic consciousness, finds everything in itself" (Maharishi). At this level, even the process of experiencing the world is said to become fully self-referral: All levels of mind and objective reality are experienced in terms of the Self. Even within unity consciousness, there is said to be a sequence of substages whereby first the primary object of attention, and then objects of secondary, tertiary, and further levels of attention, are gradually appreciated in terms of the Self until a fully mature state of unity consciousness, referred to as "Brahman consciousness," is established. In this ultimate state of wholeness, the *Bhagavad Gita* says that one "sees the Self in all beings, and all beings in the Self" (Maharishi).

Source: Excerpted from Alexander et al. (1990, 293, 301–24).

Table B.2 Integrative levels of ethical reasoning (Cheryl Armon).

Level	The Good	Good work
Preconventional		
1. Radical egoism	The Good revolves around the gratification of desires and the realization of fantasy. The Good is that which provides the individual with actual or fantasized physical experience. *Doing* good is undifferentiated from *having* a good experience.	For children at stage 1, good work is undifferentiated from fantasized or experienced pleasurable activities or roles. There is an absence of a conception of the instrumental value of work to provide for the self's material needs.
2. Instrumental egoism	The Good is that which serves the individual's interest, including emotional, as well as physical desires. There is a consistent conception of the Good that differs markedly from stage 1 in that it includes the individual's motives and intentions and the contemplation of actual consequences. There is a strong desire to be praised and liked by others and to satisfy material wants. The Good that is achieved through praising and approving can be immediate (self-other), general (stereotypical socially approved roles), or symbolic (sufficient material reward). The Good is that which results in "happiness."	At stage 2, the recognition of the reciprocal relation between working and its consequences of serving the self's needs is clear. *Doing* good work is seen not only as a source of material reward, but also as a source of satisfaction, particularly through praise from others. Same-sex, socially approved work roles are consistently mentioned. However, there is an absence of a sense of what the actual role requirements might be. *Good* work is often seen as equivalent to *hard* work.

(continued)

Table B.2 Integrative levels of ethical reasoning (Cheryl Armon).

Level	The Good	Good work
Conventional		
3. Affective mutuality	Good is an affective sense of happiness or fulfillment, a result of positive interpersonal experience. Good is determined by what *feels* good. There is a distinct sense that good can be determined by the absence of bad. A major component of what is good is that which helps the self and others to feel good (be happier, more successful, etc.) and promotes mutuality between self and others in the immediate social environment.	At stage 3, good work is identified with socially beneficial work roles that promote mutuality between self and other in one's immediate work environment. Self-satisfaction is a result of the interactions involved in serving others—interactions that provide positive affective experiences.
4. Individuality	Good is the expression of the individual's *self-chosen interests and values*. A central theme is "meaning." Whatever one does in life, it must be considered valuable and meaningful in a personal sense. The emphasis on individuality, however, is coupled with the awareness of the necessary adherence to moral and societal norms for the maintenance of one's good life.	Good work at stage 4 becomes relativized to include any self-chosen activity that provides personal satisfaction or enjoyment, financial security, and something useful in terms of social utility, or that at least does not harm others.
Post-conventional		
4./5. Subjective-relativism	The Good stands outside moral and societal norms and is a subjective-relative conception dependent on each individual's psychological reaction to particular activities, events, persons, etc. Good is that which an individual *feels or believes to be good* within the constraints of individual rights and justice.	At transitional stage 4/5, good or bad work is subjective and a relative conception. Within the constraints of individual's basic rights it is dependent solely on the perceived effect of the work on the worker.

(continued)

Table B.2 Integrative levels of ethical reasoning (Cheryl Armon).

Level	The Good	Good work
5. Autonomy	The Good is the result of a consistent ethical philosophy that views the individual as an autonomous agent. The Good is manifested in productive, meaningful activities that not only draw upon the individual's higher level capabilities, but that are also consistent with an individual's general philosophy. There is the need to broaden the evaluation of the Good beyond the self to include a societal perspective. This is achieved through a "*balancing*" *of responsibility to society* or humanity of which the individual sees him/herself as a part.	At stage 5, good work represents meaningful, productive activities which draw on the individual's higher level capabilities. Such activities enhance intellectual and/or psychological self-development and/or creativity, and require a personal commitment. Some social commitment is also required, and one must "balance" between responsibility to self and responsibility to society.
6. Universal holism	The Good for the self and the Good for the society or humanity becomes integrated under a larger conception of "humanity" or "nature." The Good is universalized in that *Good for the self is Good for society*, because "society" is made up of many similar selves. Category conflicts between the Good and the Right are resolved because what is good must conform to universal moral principles of justice and respect for persons.	At stage 6, good work is embodied in the exercising of fully realized human interests and capabilities for all persons in the context of a just society. Good work has intrinsic value and thereby results in qualitative impact on both society or humanity and the individual simultaneously.

Source: Based on Armon (1984, 365–66: Tables 17.2,17.3).

Table B.3 Integrative levels of value (Don E. Beck and Christopher C. Cowan).

Level	Characteristic beliefs and actions	Representatives
First tier		
1. Survivalistic (beige)	Uses instincts and habits just to survive. Distinct self is barely awakened or sustained. Food, Water, Warmth, Sex, and Safety have priority. Forms into survival bands to perpetuate life.	The first people, newborn infants, senile elderly, late-stage Alzheimer's victims, mentally ill street people, starving masses, bad drug trips, and "shell shock;" described in anthropological fiction like Jean Auel's *Clan of the Cave Bear.*
2. Magical (purple)	Obey the desires of spirit beings and mystical signs. Show allegiance to chief, elders, ancestors and the clan. Preserve sacred objects, places, events, and memories. Observe rites of passage, seasonal cycles, and tribal customs.	Belief in guardian angles and Voodoo-like curses, blood oath, ancient grudges, chanting and trance dancing, good luck charms, family rituals, and mystic ethnic beliefs and superstitions; strong in Third-World settings, gangs, athletic teams, and corporate "tribes."
3. Impulsive (red)	The world is a jungle full of threats and predators. Breaks free from any domination or constraint to please self as self desires. Stands tall, expects attention, demands respect, and calls the shots. Enjoys self to the fullest right now without guilt or remorse. Conquers, out-foxes, and dominates other aggressive characters.	The "Terrible Twos," rebellious youth, frontier mentalities, feudal kingdoms, James Bond villains, epic heroes, soldiers of fortune, "Papa" Picasso, wild rock stars, Attila the Hun, William Golding's *Lord of the Flies*, and Mighty Morphin Power Rangers.
4. Purposeful (blue)	One sacrifices self to the transcendent Cause, Truth, or righteous Pathway. The Order enforces a code of conduct based on eternal, absolute principles. Righteous living produces stability now and guarantees future reward. Impulsivity is controlled through guilt; everybody has their proper place. Laws, regulations, and discipline build character and moral fiber.	Rev. Billy Graham, Frank Capra's *It's a Wonderful Life*, Puritan America, Confucian China, Hassidic Judaism, Dickensian England, Singapore discipline, codes of chivalry and honor, charitable good deeds, the Salvation Army, Islamic fundamentalism, Garrison Keillor's Lake Wobegon, Boy and Girl Scouts, patriotism.

(continued)

Table B.3 Integrative levels of value (Don E. Beck and Christopher C. Cowan).

Level	Characteristic beliefs and actions	Representatives
5. Achievist (orange)	Change and advancement are inherent within the scheme of things. Progress by learning nature's secrets and seeking out best solutions. Manipulate Earth's resources to create and spread the abundant good life. Optimistic, risk-taking, and self-reliant people deserve their success. Societies prosper through strategy, technology, and competitiveness.	The Enlightenment, "success" ministries, Ayn Rand's *Atlas Shrugged*, Wall Street, Rodeo Drive, The Riviera, emerging middle classes, the cosmetics industry, trophy hunting, Chambers of Commerce, colonialism, TV infomercials, the Cold War, DeBeers diamond cartel, breast implants, fashion, J.R. Ewing and *Dallas.*
6. Communitarian (green)	The human spirit must be freed from greed, dogma, and divisiveness. Feelings, sensitivity, and caring supersede cold rationality. Spread the Earth's resources and opportunities equally among all. Reach decisions through reconciliation and consensus processes. Refresh spirituality, bring harmony, and enrich human development.	John Lennon's music, Netherland's idealism, Rogerian counseling, liberation theology, Doctors without Borders, Canadian health care, ACLU, World Council of Churches, sensitivity training, Boulder (Colorado), Green Peace, Jimmy Carter, Dustin Hoffman in *The Graduate*, animal rights, deep ecology, Minneapolis-St Paul social service, the music of Bruce Cogburn, Ben & Jerry's Ice Cream company.
Second tier		
7. Integrative (yellow)	Life is a kaleidoscope of natural hierarchies, systems, and forms. The magnificence of existence is valued over material possessions. Flexibility, spontaneity, and functionality have the highest priority. Knowledge and competency should supersede rank, power, status. Differences can be integrated into interdependent, natural flows.	Carl Sagan's astronomy, Peter Senge's organizations, Stephen Hawking's *Brief History of Time*, W. Edwards Deming's objectives, Paul Newman's version of stardom, chaos theory, appropriate technology, eco-industrial parks (using each other's outflows as raw material), early episodes of TV's *Northern Exposure*, Fel-Pro, Inc., Fred Alan Wolf's "new physics," Deepak Chopra's *Ageless Body.*
8. Holistic (turquoise)	The world is a single, dynamic organism with its own collective mind. Self is both distinct and a blended part of a larger, compassionate whole. Everything connects to everything else in ecological alignments. Energy and information permeate the Earth's total environment. Holistic, intuitive thinking and cooperative actions are to be expected.	Theories of David Bohm, McLuhan's "global village," Gregory Stock's Metaman, Rupert Sheldrake and morphic fields, Gandhi's ideas of pluralistic harmony, Ken Wilber's "Spectrum of Consciousness," James Lovelock's "Gaia hypothesis," Pierre Teilhard de Chardin's "noosphere."

Source: Excerpted from Beck and Cowan (1996, 45–47).

Table B.4 Integrative levels of religious representation (Robert N. Bellah).

Level	Characteristics
1. Unitive	So in developing a typology of religious representations, we must start with the null category of unitive representation—that is, representations that attempt to point to the unitive event of experience. There is a certain affinity between unitive experience and what Piaget, borrowing from J.M. Baldwin, calls "adualism" of the child. Piaget says that in this adualism of the early months of life, "there does not yet exist any consciousness of self; that is, any boundary between the internal or experienced world and the world of external realities." I do not mean to imply that unitive experiences are in any simple sense a "return" to early infantile experience, but it may be that possibilities existing then, as in other kinds of early experiences, are never lost but can be reappropriated in much more complex form later on.
2. Enactive	The second mode of religious representation is what I shall call enactive representation, adapting from what Jerome Bruner sees as the earliest form of true representation in the child. Religious enactive representation is the bodily acting out of religious meaning, as in bowing, kneeling, eating, dancing. It may be a simple gesture, almost unconscious, like crossing oneself for those for whom that gesture has become second nature. The gesture *is* the meaning—it enacts it—it doesn't, or doesn't necessarily, point to anything else.
3. Symbolic	Symbols, in the sense of material or verbal representations, more obviously "stand for" something else than do unitive events or bodily gestures, though unitive events and bodily gestures can be both symbolic and symbolized. But symbols can also be consciously created in drawings, statues, even buildings, in sounds and, of course, in words. When symbols are primarily visual in their appeal we can speak of iconic symbolization; when they involve sound, they are or verge upon musical symbolization; when they involve words, we can speak of poetic symbolization. A critically important mode of verbal symbolization is narrative, the story of myth (we should remember that *mythos* is simply the Greek for "story"), which is important in almost all kinds of religion.
4. Conceptual	Finally, we can speak of the conceptual mode of representation, a form of abstract verbal reflection and argument that follows on and criticizes primary religious actions and representations. Conceptual representation is present in all religions to some degree but becomes particularly significant in the axial religions, where theory, though still related to ritual and narrative, has to some degree become disembedded. Jean Piaget has perhaps done more than anyone else to show how the child moves from symbol to concept in making sense of the world. It is also at this time that the child becomes adept at what Piaget calls "formal operations"—logical thought and mathematics.

Source: Excerpted from Bellah (2011, 13–14, 37).

Table B.5 Integrative levels of epistemology (Susanne Benack).

Level	Characteristics	Theory of knowledge	Theory of truth/value
1. Dualism	*Formal-operational* For the dualist, the world is bifurcated into right and wrong, we and they. Truth and right are absolute, objective givens, guaranteed by infallible authorities (God, parents, reason) or simply existent (Platonic forms, facts). Knowledge comes in isolated units (beliefs, propositions) whose truth is ascertained by comparing them to standards that exist apart from the knower. The dualist understands experience as the imprinting of the nature of the object upon the passive subject. The dualist recognizes that subjective factors can play a role in determining experience and that there is a distinction between "experience" and "reality." Even a ten-year-old child realizes that people may have different experiences of a common situation, depending on subjective factors. Prior to the development of relativistic thought, however, such differences are understood as deviations from a common reality that they all approximate. Yet, the *function* of the subject is to reproduce external reality. The veridicality of experience can be evaluated only in reference to the object. The nature of the subject is irrelevant to truth. The dualist perceives truth in binary terms, if one position on a question is right, the others must be wrong. When confronted with someone whose moral position contradicts his or her own, the dualist cannot admit the legitimacy of the other's position without violating his or her dualism. Empathizing with the experience of someone who is seen holding wrong, or immoral, beliefs and feelings present a double edged threat to the dualist. He or she will either experience the anxiety and discomfort associated with having an incorrect belief or an immoral feeling, or he or she will take on the other's standards and see his or her *own* beliefs and feelings as wrong.	Objectivity: sees character of knowledge/experience as determined by the nature of the object of knowledge ("the known," "reality"). Doesn't recognize existence of different subjective perspectives; expects people to have similar experiences of common situations. Is *unable* to assume other's perspectives; doesn't comprehend the task of monitoring and manipulating one's perspective on an event.	Single standard of truth or rightness; correspondence to the "real". Only one interpretation of events is correct; others must be false, distorted. Is *unwilling* to assume other's perspective; feels moral opposition to adopting "false" beliefs or "wrong" feelings as though they were "true/right".

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Table B.5 Integrative levels of epistemology (Susanne Benack).

Level	Characteristics	Theory of knowledge	Theory of truth/value
2. Relativism	*Postformal* With the development of relativistic thought the notion of objective reality, independent of the subjects disappears, or at least becomes subordinate, a hypothesis, impossible to confirm and not essential to the notion of *the* truth. The nature of experience is seen as dependent upon the nature of the subject, which is now understood to contribute actively to the *creation* of knowledge. Understanding the nature of the subjective systems that determine experience, such as intellectual paradigms, species-specific categories of thought, and cultural interpretive systems, becomes the focus of epistemological inquiry. The move from dualism to relativism, then, fundamentally transforms one's vision of the world. The dualist sees people as living together in a common "outside" world that they all perceive similarly. The relativist sees a world in which there is no single "given" reality. Multiple "worlds of experience" are generated by multiple epistemological subjects. Each species, each culture, each individual is seen as the center of a private world, experiencing a "reality" that may or may not overlap that of his fellows. In the relativist world-view, then, there is no "reality" without a simultaneous awareness of the subjective vantage point from which it is seen. There is no object without an implied subject. The relativist has the ability to take multiple perspectives on any question without denying the partial values and limitations of each position. Differences in opinion are not seen as negating one's own, but as the expectable result of the different subjective "lenses" through which people view reality. The relativist is less threatened by identifying with, or taking the role of, others whose values are perceived as different. In a relativistic world-view, the differentness between people's perspectives is made prominent. With the onset of relativism, one becomes both more aware of people's differences and less bothered by them.	Subjectivity: sees character of knowledge/experience as determined by the subjective perspective of the knower. Recognizes existence of different perspectives from which people view events, and the different experiences they generate; differentiates own/other's perspectives; expects people's experience of common situations to differ. Is *able* to monitor and manipulate own perspective; can put aside one perspective and assume another; can understand other's *perspective* as well as content of other's experience	Knowledge-claims evaluated by multiple criteria of truth or value; multiple "truths" generated by different subjective perspectives, all having partial validity. Different interpretations of an event can be seen as containing "their own truth;" validity accorded to other's experience as well as one's own. Is *willing* to assume other's perspectives, put aside own beliefs, values, assumptions.

Source: Excerpted from Benack (1984, 341–48).

Table B.6 Integrative levels of interpersonal reasoning (Fredda Blanchard-Fields).

Level	Characteristics
1.	Responses at this level are characterized by a dualistic conception of reality where only one account of the event is acknowledged. An absolutistic conception of reality is demonstrated through the assertion that only one account holds the "correct" answer. With only one perspective recognized, interpretation of the event and the event itself remain fused. Thus, there is no verbal differentiation between the event and its interpretation. Finally, subjective biases inherent in interpretation as well as psychological factors are totally ignored in describing and/or explaining the accounts.
2.	At this level, there still remains a strict reliance on dualistic, right versus wrong, reasoning with the presentation of one account. Although differing perspectives are not totally ignored at this level, no attempt to deal with them is evidenced. Perceived discrepancies either are not acknowledged as interpretive discrepancies or they are deemed inconsequential because of incomplete information. This, again, fuses interpretation and the event. Subjectivity is still disallowed in the analysis; thus, the individual still searches for absolutes, objective answers. As in level 1, subjective biases and psychological causality are ignored in responses.
3.	At this level, dualistic reasoning begins to give way to an acknowledgement of multiple outcomes. Yet, all outcomes are not considered valid in their own right. There still remains the search for absolute truth that is perceived as external to the individual. Thus, there is a strong reliance on factual evidence, such as that found in a neutral third party. This is much like Selman's notion of an idealized objective third party. An event is differentiated from its interpretation; therefore, discrepancies are clearly acknowledged in terms of differing perspectives. Finally, no judgment nor evaluations based on subjective criteria are incorporated into the analysis. Instead, ambiguity, in the form of factual contradiction, is deemed resolvable by "sticking to the facts."
4.	This level is distinguished by a first attempt to integrate dualisms by proposing a reconciliation of differences in the form of a neutral account, devoid of personal bias. However, an underlying dualism between what is objective and what is subjective remains. Thus, the search for absolute truth remains and is accomplished be referring only to the underlying "objective" event structure. Both accounts can be right to the degree that they both agree on the underlying facts. Responses indicate that the individual clearly recognizes interpretive discrepancies in accounts. Finally, there is a considerable lack of evaluation based on psychological criteria (for example, subjective or self vs. other differences) other than those related explicitly to the text.

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Table B.6 Integrative levels of interpersonal reasoning (Fredda Blanchard-Fields).

Level	Characteristics
5.	At this level, each perspective is seen to represent a valid, unique, and irreconcilable frame of reference, relinquishing the dualism of right versus wrong. An absolutistic construction of reality gives way to a conception of truth relegated to an interpersonal context of differing points of view. A clear differentiation between events and interpretation is depicted in these responses with emphatic acceptance of contradiction. Finally, alternative explanations and evaluation responses (that is, going beyond the information given, motivational factors, emotional contingencies, developmental histories) are given for what influences the process of interpretive discrepancies. Yet, as seen in the example, a nonreciprocal differentiation between a rational or objective point of view and one that is emotional is adopted. Subjectivity is seen to subordinate objectivity; therefore, a dilemma is created with no effective way of dealing with the conflict.
6.	Multiple perspectives resulting from different interpretive frameworks are clearly defined at this level. The individual as interpreter is explicitly acknowledged and incorporated in any conclusions drawn. The individual recognizes the need to weigh these discrepant sources of information in order to arrive at the "best" answer for the particular situation. At this level, there is no evidence of dualistic or absolutistic thinking. Responsibility for one's thinking is related back to the self and other in the form of interpersonal mutuality and respect.

Source: Excerpted from Blanchard-Fields (1989, 79–81).

Table B.7 Integrative levels of natural philosophy (John M. Broughton).

Level	Self/World	Mental/Material	Physical/Social	Reality/Appearance	Knower/Known
1. Objective (age 4–7)	*Presumptive* Self-evident, bodily self. Not differentiated from reflexive "itself."	*Adualist* Gross head/body distinction. Visible and invisible not differentiated. Mind and body mutually permeable.	*Animistic* Living and nonliving only partly distinguished. People distinguished from things only along quantitative physical dimensions.	*Objective* Reality presumed. Simple and immediate existence of external things. Real undifferentiated from nonartificial.	*Dogmatic* Thought and its objects undifferentiated. Direct, automatic knowing. Single extrinsic truth, known and handed down by authority.
2. Individual (age 8–12)	*Individual* Self is specific person, me or you. Perceiving, acting person. Source or agent.	*Organic* Mind differentiated from body as brainlike organ controlling rest of body. Discrete, nonvisible mental contents.	*Subjective* People distinguished as conscious, sentient, or as self-active individuals. Body is (subordinate) part of person.	*Native realist* Certainty of reality directly sensed. Appearance is the way something "looks" and this *is* reality. Real differentiated from imaginary as persistent.	*Empirical* Partial differentiation of knower from known. Experience directly caused by object. Subjective not opposed to objective. Truth is absolute fact, is opposed to lie, and is individually apprehended and asserted.
3. Divided (age 12+)	*Divided* Self is mind (mental self) more than body (physical self). Unique subjective traits, opinions, beliefs, or values. Authentic inner self differentiated from false outer appearance (social personality or role self).	*Immature dualist* Abstract mental differentiated from concrete physical as a fluid and invisible medium. Mental and physical as shared classes with interdependence (overlap).	*Interpersonal* People have personality and show themselves to other people. Body is appearance, ambiguous. Physical as impersonal "scientific" world.	*Realist* Appearance generally realistic, but mind may add personal distortion (opinion or value). Mental is belief rather than reality.	*Social* Concrete facts known by individuals. Truth as interpersonal demonstration and plausibility (overlap). Nascent skepticism.

(continued)

Table B.7 Integrative levels of natural philosophy (John M. Broughton).

Level	Self/World	Mental/Material	Physical/Social	Reality/Appearance	Knower/Known
4. Dualist (age 18+)	*Substantial* Self as system: soul, intellect, logic, identity, or "cogito" (self-control). Self has mental and physical attributes. Self-concept, or "me," rather than "I." Generalized self or perspective.	*Cartesian* Dualism between objective mechanistic system of scientific cause/effect, and subjective or spiritual world of belief, purpose, and reason. Unconscious differentiated from conscious.	*Individual* Social as system of abstract individuals. People as spiritual, self-regulating, and purposeful (vitalist), instances of the general rule. Body now estranged as part of material world (mechanist).	*Dualist* Reality assumed. Noumenon differentiated from phenomenon. Substantial reality is lawlike system generating appearances (data).	*Positivist* Knowledge is inductive generalization of observation, constructive copy of world. Truth, which subordinates reality, is replicable and is achieved through social-conventional testing of models. Impartial "generalized other" defines objective standpoint.
5. Subjective (age 20+)	*Process* Self as flux of experience, or process of self-realization. Breakdown of substantial soul or identity. Everything has self.	*Reductionist* Monistic materialism. Mind as epiphenomenon.	*Anarchist* Fusion of natural and social. (Either reduction of social to biological or panpsychism.) Dialectic of organization and anarchic chaos.	*Subjectivist* All reality phenomenal. Full determinism at level of data.	*Relativist* All knowledge is subjective, or arbitrary convention. Opposition to objectification. Skepticism and solipsism.
6. Rational (age 25+)	*Epistemological* Self as transcendental ego, or function of universal self-consciousness. Self-conceiver or subject-self differentiated from empirical or object-self.	*Parallelist* Functional "mental" and "physical," psychology versus physiology, as ideational systems of explanatory constructs.	*Rational* Social as rational democratic organization, versus natural as nonrational but systematic sphere. Natural law. Physical and social sciences.	*Perspectivist* Reality presupposed. Reality defined by coherence and utility of system within which it is interpreted.	*Methodological* Objective relativism. Knowledge and truth defined by intersubjective use of paradigm, such as idealism, behaviorism, etc. Logical level distinguished from empirical.

(continued)

Table B.7 Integrative levels of natural philosophy (John M. Broughton).

Level	Self/World	Mental/Material	Physical/Social	Reality/Appearance	Knower/Known
7. Dialectical Materialist	*Historical* Self as trans-individual subject (e.g., class subject), transforming natural/social reality.	*Interpenetrative* Dialectical materialism. Nature and culture penetrate each other through human activity (work).	*Dialectical* Natural world transformed into cultural, or alienated from it through domination.	*Materialist* Objective material reality dynamically evolving and appearing through human activity.	*Social* Knowledge as active, social transformation of reality through man-made, historical categories.

Source: Based on Broughton (1978, 80–81: Table 1).

Table B.8 Integrative levels of representation (Jerome S. Bruner).

Level	Characteristics	System for processing information	Example
1. Enactive	By enactive representation I mean a mode of representing past events through appropriate motor response. We cannot, for example, give an adequate description of familiar sidewalks or floors over which we habitually walk, nor do we have much of an image of what they are like. Yet we get about them without tripping or even looking much.	Action (knowing something through doing it)	Bicycle riding, tying knots, aspects of driving
2. Iconic	Iconic representation summarizes events by the selective organization of percepts and of images, by the spatial, temporal, and qualitative structures of the perceptual field and their transformed images. Images stand for perceptual events in the close but conventionally selective way that a picture stands for the object pictured.	Imagery (knowing something through a picture or image of it)	An image of a knot can provide a schema around which action can be sequentially organized.
3. Symbolic	Finally, a symbol system represents things by design features that include remoteness and arbitrariness. A word neither points directly to its referent here and now, nor does it resemble it as a picture. The other property of language that is crucial is its productiveness in combination, far beyond what can be done with images or acts.	Language (knowing something through some such symbolic means as language)	The lexem *Philadelphia* looks no more like the city so designated than does a nonsense syllable.

Source: Excerpted from Bruner (1974, 316, 325, 328).

Table B.9 Integrative levels of tasks (Michael L. Commons).

Level	Characteristics	Example
0. Calculatory	Exact without generalization.	Simple machine arithmetic on $0s, 1s$.
1. Sensory or motor	Discriminate in a rote fashion, stimuli generalization, move; move limbs, lips, eyes, head; view objects and movement. Discriminative and conditioned stimuli.	Either see circles, squares, etc., or instead, touch them. ○ □
2. Circular sensory-motor	Form open-ended classes; reach, touch, grab, shake objects, babble; Open ended classes, phonemes.	Reach and grasp a circle or square. ○ □
3. Sensory-motor	Form concepts; respond to stimuli in a class successfully. Morphemes, concepts.	A class of open squares may be formed. □ □ □ □ □
4. Nominal	Find relations among concepts. Use names; use names and other words as successful commands. Single words may be ejaculatory and exclamatory, and include verbs, nouns, numbers' names, letters' names.	That class may be named, "Squares."
5. Sentential	Imitate and acquire sequences; follow short sequential acts; generalize match-dependent task actions; chain words together. Use pronouns.	The numbers, $1, 2, 3, 4, 5$ may be said in order.
6. Pre-operational	Make simple deductions; follow lists of sequential acts; tell stories. Count random events and objects; combine numbers and simple propositions. Use connectives: as, when, then, why, before; products of simple operations.	The objects in a row of 5 may be counted; last count called 5, five, cinco, etc. ∗ ∗ ∗ ∗ ∗ □ □ □ □ □ ○ ○ ○ ○ ○ □/"} Q
7. Primary	Simple logical deduction and empirical rules involving time sequence. Simple arithmetic. Can add, subtract, multiply, divide, count, prove, do series of tasks on own. Times, places, counts acts, actors, arithmetic outcome from calculation.	There are behaviors that act on such classes that we call simple arithmetic operations. $1 + 3 = 4; 5 + 15 = 20; 5(4) = 20; 5(3) = 15$

(continued)

Table B.9 Integrative levels of tasks (Michael L. Commons).

Level	Characteristics	Example
8. Concrete	Carry out full arithmetic, form cliques, plan deals. Do long division, follow complex social rules, take and coordinate perspective of other and self. Use variables of interrelations, social events, what happened among others, reasonable deals.	There are behaviors that order the simple arithmetic behaviors when multiplying a sum by a number. Such distributive behaviors require the simple arithmetic behavior as a prerequisite, not just a precursor. $5(1 + 3) = 5(1) + 5(3) = 5 + 15 = 20$
9. Abstract	Discriminate variables such as stereotypes; use logical quantification; form variables out of finite classes based on an abstract feature. Make and quantify propositions; use variable time, place, act, actor, state, type; uses quantifiers (all, none, some); make categorical assertions (e.g., "We all die.").	All the forms of five in the five rows in the example are equivalent in value. $x = 5.$
10. Formal	Argue using empirical or logical evidence; logic is linear, one-dimensional; use Boolean logic's connectives (not, and, or, if, if and only if); solve problems with one unknown using algebra, logic, and empiricism; form relationships out of variables; use terms such as if . . . then, thus, therefore, because; favor correct scientific solutions.	The general left hand distributive relation is $x * (y + z) = (x * y) + (x * z)$
11. Systematic	Construct multivariate systems and matrices, coordinate more than one variable as input; situate events and ideas in a larger context, that is, considers relationships in contexts; form or conceive systems out of relations: legal, societal, corporate, economic, national.	The right hand distribution law is not true for numbers but is true for proportions and sets. $x + (y * z) = (x * y) + (x * z)$; $x \cup (y \cap z) = (x \cap y) \cup (x \cap z)$ *Symbols:* ∪ = union (total elements) ∩ = intersection (elements in common)

(continued)

Table B.9 Integrative levels of tasks (Michael L. Commons).

Level	Characteristics	Example
12. Metasystematic	Integrate systems to construct multisystems or metasystems out of disparate systems; compare systems and perspectives in a systematic way (across multiple domains); reflect on systems, that is, is metalogical, meta-analytic; name properties of systems (e.g., homomorphic, isomorphic, complete, consistent, commensurable).	The system of propositional logic and elementary set theory are isomorphic. $x \,\&\, (y \; or \; z) \;=\; (x \,\&\, y)$ or $(x \,\&\, z)$ Logic; $x \cap (y \cup z) = (x \cap y) \cup (x \cap z)$ Sets; T(False) ⇔ ∅ Empty set; T(True) ⇔ Ω Universal set *Symbols:* & = and ⇔ = is equivalent to T = Transformation of
13. Paradigmatic	Discriminate how to fit, and fit, metasystems together to form new paradigms. Includes ability to show that there are no ways to fit together any set of metasystems.	$\Omega_1 \circ \Omega_2 = \psi^a$ *Symbols:* Ω_n = e.g., Algebraic Metasystems Ω_n = e.g., Geometric Metasystems ψ^a = Analytic Geometry as a paradigm
14. Cross-paradigmatic	Fit paradigms together to form new fields. Only by crossing paradigms can the new fields be conceived and formed; it requires the coordination of multiple paradigms to form genuinely new fields.	

Source: Based on Commons (2008, 311–12: Table 1).

Table B.10 Integrative levels of ego identity (Susanne R. Cook-Greuter).

Level	Characteristics	Self-definition	Perspective
Preconventional	*Typical age (in modern Western societies): 0–12 years*		
1. Symbiotic (presocial)	Describes adults who are unaware of themselves as separate individuals. They may be nonverbal, driven by basic needs and fundamentally helpless with others.	Confused, confounded	
2. Impulsive	Describes individuals who show signs of beginning use of language simultaneously with the ego as reflected in such statements as “I want” and “mine”. They are concerned with safety and the gratification of basic needs.	Rudimentary, physical self-labeling, crude dichotomies	First-person
3. Self-protective	Describes people who see the world only from the perspective of their own wants and needs. To get what they want, they need to control others and safeguard their interests. It is the first stage of beginning purposeful social interaction. “Opportunists” see the world from an “I win/you lose” perspective. Power is used where useful: “Might makes right.”	Basic dichotomies, single concrete feature, minimal self-description in terms of desires	
4. Rule-oriented	Describes individuals who are discovering the second-person perspective. They have a vacillating point of view. Sometimes the question is: “How do I look to others?” and at other times: “How do they look to me?” Comparing is restricted to concrete and external aspects of self and others. Interest in being part of groups (greater power) and following rules.	Primary actions: Single external feature, beginning comparisons	Second-person

(continued)

Table B.10 Integrative levels of ego identity (Susanne R. Cook-Greuter).

Level	Characteristics	Self-definition	Perspective
Conventional	*Typical age (in modern Western societies): 12+ years (approximately 80% of American adults)*		
5. Conformist	Describes persons with an early adolescent frame of mind. They identify themselves mostly as members of familiar groups. The boundaries between self and others are confused. But unlike people at the Self-protective stage, there is real concern for the well-being of others. One takes responsibility for others. Dependency needs are high. Fear of rejection leads Conformists to be overly and nice and to repress negative feelings. There is unquestioned acceptance of the Family and in-groups (such as peer groups, family values, club, church) and loyalty is important. The unfamiliar (out-groups) is rejected and easily maligned. External social status and material goods are important as indices of one's value.	*Concrete operations:* Several external features; vital statistics, rudimentary internal states, negative suppressed	
6. Self-conscious (self-aware)	Characterizes people who are able to step back and look at themselves as objects for the first time. Generally, however, the focus is directed outside the self, on others. Conventional morality and self-righteousness strong. Stage 6 people often assert and express their newly discovered personhood albeit in traditional terms. They try to differentiate themselves from the previous familiar context. Persons on this stage begin to recognize that others have different selves and thoughts, and that they can look at you as an object as well. Believe in Authority and the Truth are strong. Self-aware persons are concerned with duty, responsibility, right action. Technicians and bureaucrats often inhabit this frame of mind with excellent results for society.	*Abstract operations:* Clusters of external attributes, simple traits, beginning introspection; beginning sense of separate self-identity and unique personhood	Third-person
7. Conscientious	Adds the concept of linear time (sequentiality) as a conscious object to the third-person perspective and expands the meaningful social context to others within the same society with similar ideologies and aspirations. At stage 7 one starts to explore the nature of oneself in terms of traits through more ongoing introspection. Stage 7 individuals are interested in reasons, causes, goals, costs, consequences, and the effective use of time. Because of the expanded view, the Conscientious person plans, prioritizes, and optimizes procedures to achieve goals. Quintessential conventional scientific-rational frame of mind.	*Formal operations:* Self as system of roles and clusters of traits; prototype personality; individual self-agency; aware of recent past and future, and causality	

(continued)

Table B.10 Integrative levels of ego identity (Susanne R. Cook-Greuter).

Level	Characteristics	Self-definition	Perspective
Postconventional	*(Approximately 10% of the worldwide adult population)*		
8. Individualist	The fourth perspective allows one to look at one self as changing over time and reacting differently in different contexts. Initial discovery that people interpret experience, that is, bring their own "meaning" to the same event. The same thing means different things to different people. Self and context (object) form an interdependent system. There are as many truths as there are individuals. No truth can therefore be better than any other. Everything seems relative, undecidable, context dependent. Discovery of cultural and personal "assumptions" and own tendency towards defensive moves. Individualists realize that reality is not out there, separate from the viewer as previously felt, but connected to the person who experience it. Increasing ability to see how things are related and influence each other in non-linear ways.	*Systematic operations:* Systems theory concepts perceived; self as unique entity	Fourth-person
9. Autonomous	Persons at the Autonomous stage realize that they may notice different conflicting aspects of themselves at different times but, unlike persons at stage 8 who may despair about ever knowing who they really are, Autonomous individuals become able to "own" more of the contradictory parts of themselves. They can integrate previously compartmentalized sub-identities of the self into a coherent new whole or core identity. They are convinced that higher development is better and closer to truth. Higher is believed to be better because the more differentiated and the more autonomous persons become, the more they can claim that they have a nondisturbed (true) and realistic view of themselves and the world.	Autonomous, multiple roles; self-generated core-identity; aware of many defenses and expressions of inner conflict; sense of self-esteem, empowerment	

(continued)

Table B.10 Integrative levels of ego identity (Susanne R. Cook-Greuter).

Level	Characteristics	Self-definition	Perspective
Postautonomous			
10. Construct aware (ego-aware)	Construct-aware adults seem to realize that their self-identity is always and only a temporary construct. Hence, they become less invested in the idea of an individual ego that serves the unconscious function of creating a stable self-identity. They see through the mental habits of analyzing, comparing, measuring, and labeling as means to reify and map experience. They understand the need for a different approach to knowing, one that responds to the immediate, unfiltered experience of what is. This new way of knowing requires an attitude of complex openness: One that is free from wishing for any particular outcome, and free from the automatic habits of representational thought. Paradoxically, the very desire for freedom from any particular idea of how the world should be, keeps one fettered within that frame of reference.	Complex matrix of self-identifications, at the same time questioning their adequacy; description of self in stages (approximations) and critique of conventional labeling	Fifth-person
11. Unitive	The self-sense of the Unitive stage is fluid, "undulating," based on people's trust in the intrinsic value and processes of life. At the unitive stage, a whole logical/psycho-logical system (the rational, representational domain in human development) has become the content—an element or object in a higher-order, postrepresentational integration. In the Unitive self-experience, individuals see through the function of the ego to objectify and reify the self by defining (delimiting) it. They experience the self in its moment to moment transformation and therefore consciously decline to satisfy the implicit demand for objective self-identification. It is important to realize that from a Unitive point of view higher stages are not better than lower ones because all are necessary parts of interconnected reality and an overall evolutionary process where everything is and will be just the way it is.	Description of self as in constant flux and transformation; transcendent awareness; I am no(-)body, no(-)thing	

Source: Excerpted from Cook-Greuter (2010a, 57–66, 197–203).

Table B.11 Integrative levels of thought (Andreas Demetriou et al.).

Level	Characteristics
1. Episodic representations	(0–2 years)
2. Realistic mental representations	Representations at 2–3 years of age are reduced mental projections of episodic representations with a component of implicit awareness. Children at 3.5 years implicitly differentiate between correctly remembered (e.g., objects observed carefully) and not remembered items (e.g., objects seeing only for a little), suggesting an awareness of representations stored earlier in memory. Also, toddlers are aware that when one saw an object one knows about it. This makes Theory of Mind possible, enabling toddlers to understand that one's actions relate to one's representations. By the age of 4–5 years executive control is guided by a "focus-recognize-respond" program allowing toddlers to set-up action plans requiring shifting between actions according to a probe. For instance, "Sort according to color when a red tag is on and according to shape when a square tag is on." This task involves awareness of representations one may focus on and choose from, organizing action beforehand. By this age, reasoning ascents from reciting or reading episodic blocks forward to pragmatic deals: "You said I can play outside if I eat my food; I ate my food; I go to play outside." This sequence, is basically an inference locking two representations ("A occurs" and "B occurs") together into an inductive sequence (i.e., When A occurs, B also occurs).
3. Generic rules organizing representations	At 6–8 years, children are explicitly aware of mental representations and their relations with their own actions. For instance, they differentiate between easy and difficult memorization tasks, suggesting awareness of the relation between complexities of representations and learning. However, at this age, children do not yet explicitly differentiate between mental functions, such as memory and reasoning, nor do they explicitly associate each with specific processes (rehearsal vs. inference). This is possible at 8–10 years, when there is an explosion of awareness of the mental world. Children in this phase master second-order Theory of Mind (e.g., "I know that George knows that Mary knows that …") recognize that gaps in knowledge may be compensated by inference (e.g., He sorted by color, so blue objects would be in the blue box).

(continued)

Table B.11 Integrative levels of thought (Andreas Demetriou et al.).

Level	Characteristics
	In the next phase, at 8–9 years, awareness of different mental processes allows children to shift flexibly between them (e.g., to remember you need to observe carefully and rehearse; to sort you need to follow a sorting rule). Thus, in this phase, executive control is upgraded into a conceptual fluency program allowing children to shift between mental processes (e.g., memory vs. inference) or conceptual domains (e.g., they recall words belonging to different categories—fruits, animals, furniture—following a probe). Compared to the previous "focus-recognize-respond" executive program, the current program involves analytic representations of conceptual spaces. Also, they implicitly use rules specifying how different types of inference are interrelated. For instance, if accepted that "A implies B" then two possibilities are necessarily true: When A occurs then B occurs too and when B does not occur then A did not occur either. Therefore, awareness of underlying relations allows moving across conceptual spaces and rules that they may then guide executive control and reasoning. Grasp of logical necessity in this phase is a strong sign of this awareness (e.g., All balls in the box are red, so the next to be drawn out MUST be red).
4. Overarching principles integrating rules	At 11–13 years, adolescents form accurate maps of mental functions and of their own strengths and weaknesses. Thus, they cognize the constraints of different inferential processes and they can ground inference on truth and validity rules. That is, they explicitly understand that accepting certain conditions (e.g., birds fly; elephants are birds) imposes constraints on inference (i.e., elephants fly) even if a statement is admittedly wrong (elephants are not birds). This achievement allows consistency in reasoning. By the age of 13–14 years, "reasoners have a meta-representation of logical validity that can be used to inform them of the accuracy of their logical deductions, at least when reasoning about abstract materials." This protects them from drawing false conclusions. Specifically, they understand that accepting that "If A then B" does not allow drawing any conclusion about A if only knowing that B occurred or drawing any conclusion about B if only knowing that A did not occur because B may be caused by causes other than A. Therefore, the inferential relevance mastery program explicitly places truth weights on the various alternative choices that may be deduced from a logical argument. Executive control in this cycle is very different from the previous cycles. It is based on a suppositional-generative program enabling adolescents to co-activate conceptual spaces and evaluate them against each other.

Source: Excerpted from Demetriou et al. (2017, 2–4).

Table B.12 Integrative levels of naming and knowing (John Dewey and Arthur F. Bentley).

Level	Characteristics	Examples
1. Self-action	Things are viewed as acting under their own powers.	Aristotle's physics; animistic personifications; magic; personalizations of the world and its phenomena (it took Jupiter Pluvius to produce a rainstorm for the early Romans); eternal circular movement of stars under their own powers; biological "vital principle"; vocabulary of metaphysics (e.g., "substance," "entity," "reality," "actor," "creator," or "cause")
2. Interaction	Thing is balanced against thing in causal interconnection.	Galileo's inertia (a mass once in motion continues in motion in a straight line, if not interfered with by other moving masses); Newtonian mechanics; concept of heat as a substance; space and time as absolute and fixed, omitted from the process itself; biological "cell theory;" interactional systems (e.g., "particles," "principle," "law")
3. Transaction	Systems of description and naming are employed to deal with aspects and phases of action, without final attribution to "elements" or other presumptively detachable or independent "entities," "essences," or "realities," and without isolation of presumptively detachable "relations" from such detachable "elements."	Einstein's physics (brought space and time into the investigation as among the events investigated); concept of heat as configuration in molecular ranges; ecology as full system of growth or change

Source: Excerpted from Dewey and Bentley (1949, 131–34).

Table B.13 Integrative levels of understanding experiences of beauty (Rhett Diessner et al.).

Level	Characteristics
1. Prettiness	*Preoperational* This is a preoperational stage in which the subject has representational thought but cannot coordinate two variables and, thus, does not understand cause and effect. Due to lack of cause-and-effect reasoning, subjects at this stage are not able to answer probes logically, questions such as "Why is that beautiful?" It is an egocentric perspective, one that does not take the perspective of others into account. Children at this stage are subject to their perceptions and have "likes"; that is, they can name what they like and dislike, but seldom can offer reasons for their beliefs that make logical sense. Thus, a very common reason for naming something as beautiful is that they like it.
2. Beauty is big and amazing	*Concrete-operational* This is a concrete operational stage in which subjects can coordinate two aspects of a beauty experience in their explanation. However, as they do not have abstract thought, their reasons for something being beautiful will always, and only, involve the physical aspects of beauty stimuli. They have concrete empathy and can take a perspective on the outer behavior of others but do not take an abstract, inner perspective on others. They do not describe "inner" feelings in regard to a beauty experience. They can state, "I like it," as a reason for finding something beautiful, similar to stage one, but, when probed, they will have a concrete and logical reason for why they like it, which differentiates them from persons at stage one. They are subject to their needs and interests and do not take a perspective on those—those needs and interests are givens.
3. Beauty is emotionally moving	*Early formal-operational* Subjects at this stage are in Piaget's early formal operational stage and can think abstractly. They can thus imagine the inner states of artists and others and often define beauty in terms of their own emotional response to beauty stimuli. They are able to have abstract empathy and true "golden-rule" perspectives on others. They are subject to interpersonal relations and experience mutuality; they are also conformist and often talk about beauty experiences in terms of clichéd language and the typical norms of beauty in their culture. They are highly influenced by significant persons in their environment and often uncritically accept the views on beauty of their teachers, professors, friends, and parents.

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Table B.13 Integrative levels of understanding experiences of beauty (Rhett Diessner et al.).

Level	Characteristics
3./4. Subjective relativity (eye of the beholder)	When a person develops beyond the constraints of stage three but her mind has not fully transitioned to the systems view of stage four, she may enter a form of subjective relativity and recognize that everyone has his or her own viewpoint and that none of those viewpoints is objectively "right" but is right for the person who holds that viewpoint. This is the first cognitive organization of the mind in which subjects reject the possibility of objective beauty. Subjects at stage three may mention that the concept of "beauty is in the eye of the beholder," but they do so as a trite conformist clichéd viewpoint. At transitional stage three/four, subjects have rejected conformist viewpoints and hold a theory about beauty being subjective.
4. Beauty is a system	*Consolidated formal-operational* Stage four is based on Piaget's consolidated formal operations. Subjects are able to take a systems perspective and can define and describe beauty in terms of an organized hierarchy or web-like interconnections. They can understand that culture is a system that organizes the mind's responses to beauty. They are able to talk about beauty in terms of a perspective on their own identity as a person. They may have an articulated theory of beauty but will not have a perspective that "their own" theory is a reflection of the culture in which they are immersed, despite knowing that culture is an influence. They are subject to ideology, as Kegan asserts, and are conscientious in their thought patterns, being concerned about any contradictions or inconsistencies in their own logic of understanding beauty.
4./5. Systemic relativity (eye of the culture)	At stage 4/5, subjects recognize the relativity of all systems and reject the possibility that any cultural view of beauty is "right" or "objective." Their mind realizes that cultural systems create the canon of beauty and "brainwash" everyone in that culture into adopting those canons. Therefore, all sense of beauty is relative to a cultural system, and one cannot say one culture or one canon is better than another. Note that, at stage 3/4, there is a subjective relativity based on individuals' subjective views; however, stage 4/5 is a more sophisticated relativity, in which the person can take the perspective of a whole culture and "look" outside those ideological constraints. However, the individual does not yet have a universal principled perspective, which comes with stage five and which allows the mind to see principles of beauty that undergird all cultures due to our common humanity.

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Table B.13 Integrative levels of understanding experiences of beauty (Rhett Diessner et al.).

Level	Characteristics
5. Principled beauty	*Postformal* At this postformal operations stage, people can take the perspective of multiple systems and see principles that underlie disparate systems. They understand interindividuality, according to Kegan, and the interpenetration of systems. They are autonomous thinkers, who understand that everything they do is influenced by the interpenetrating systems of genes and culture, yet are able to take some kind of perspective that transcends the programming of their genes and culture. In terms of beauty, they recognize fundamental universal principles of beauty. For example, one such principle is perfection.

Source: Excerpted from Diessner et al. (2016, 29–32).

Table B.14 Integrative levels of religious orientation (Dustin DiPerna).

Level*	Characteristics
1. Magic-powerful (ritualistic/red)	The first altitude of religious orientation shows signs, expressions, and behaviors related to intuitive-projective and mythical-literal faith development. An individual here leans toward literal interpretation of sacred texts, often focusing on one or two verses of scripture in particular. The individual at this stage tends to be overly concerned with power and is often distracted with the supernatural elements of faith. Magic individuals value rites and rituals, and may be extremely superstitious. Other signs to look for at this level of religious expression are selfprotective tendencies in ego development. One may see an individual here with a primary focus of avoiding existential punishment and seeking eternal reward. Same individuals at this level have a tendency to place responsibility and blame outside of themselves. The individual at this red altitude may show signs of pre-conventional morality or perhaps the beginning stages of conventional morality. At this level of religious orientation many individuals act without much consideration for others. If lower stages of moral development are present, right and wrong are constituted by impulse rather than authority or reason. Fear of wrathful deities (or a single God) often keep people at this stage in line.
2. Mythic-membership (absolutist/amber)	An amber altitude of religious orientation corresponds to Fowler's synthetic-conventional stage of faith. At this stage an individual's ultimate concern begins to shift away from self-gratification and ego-centered drives toward an emphasis on role and identity. Often an individual at a mythic-religious orientation still maintains somewhat literal interpretations of scriptures. The individual at this stage often develops the desire for a personal relationship with God. In Islam, this period allows a deepening of one's submission to Allah. Christians, during this time, feel a drive for true companionship with Jesus. Hindus may be drawn more toward Bhakti Yoga, a practice involving love and devotion to God. At this Stage, one's personal faith or set of beliefs provide deep meaning and courage for living. Other important signs to look for that may point to this level of development are values that focus on an absolute "truth" and a puritanical sense of right and wrong. The individual at this stage may show signs that indicate a preference for hierarchical structure and order even if such structure tends to be oppressive or abuse its power. Usually, an individual at this stage of development is willing to control impulses in exchange for deferred fulfillment. The individual with mythic religious orientation often shows indications that approval of his or her group is of the utmost importance. He or she is often kept in order through feelings of guilt. In many cases, the individual's own identity extends to that of his or her own group, family, or religious community, while seeing the views of those outside the group as either wrong, un-religious, or out of line with the one *straight* path. Cognitive development at this stage most often demonstrates Piaget's concrete-operational thinking. The individual has the capacity to think in logical progressions, but in most cases does not "reflect about thinking" or consider whether their own belief systems are in themselves a coherent and logical system. Similarly, one might notice actions and demonstrations of Kegan's third-order "traditional" consciousness. The person expressing mythic stage tendencies in a given context lacks a definite capability to think entirely as an autonomous individual so morals and a sense of right and wrong often come from an external conventional authority (i.e., one's group, society, the Church, the Qur'an, the Vedas, dharma, or duty).

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Table B.14 Integrative levels of religious orientation (Dustin DiPerna).

Level*	Characteristics
3. Rational-reflective (inquisitive/orange)	Orange altitude correlates to Fowler's scale at the individuative-reflective level of faith development. Individuals at this level of development begin to question and examine all of their existing beliefs. They begin to scrutinize the myths they believed without hesitation at the previous stage, in order to find deeper meaning. For the first time individuals recognize the ability to have their own opinions outside the restrictions allowed by the group or scripture. Due to the pragmatic and reflective nature of this stage, individuals may become agnostic or atheist; both of which represent healthy expressions of religious orientation at this stage of development. Sometimes an extreme rational orientation, taking an atheistic stance, may try to rid the world of all lower levels of religious expression, declaring that they are immature and even childish. Looking at the secondary indicators of orange altitude, Graves' values meter may show signs of a strive-drive capacity. The individual at this stage is likely to place a strong emphasis on autonomy, independence, and success. He or she is usually emphatic about embracing the value of the scientific method, evidence, and *tried-and-true experience*. Piaget's formal operational stage and Kegan's fourth order of consciousness propel individuals to reflect upon their own thoughts and beliefs. This means that one will move beyond blind belief in particular religious ideologies, to now *operate* on them to improve them consciously and critically. Although it is important to remember that an analysis usually gives the most weight to signs of faith development, a religious adherent with a center of gravity near an orange altitude may show secondary indicators of particular relevance. An individual at this stage may show signs that demonstrate Loevinger and Cook-Greuter's individualist and Kohlberg's post-conventional moral development. This stage on Kohlberg's scale is usually noticed when the moral compass begins to develop within. A post-conventional shift allows one to see the deeper principles that rest behind laws and written scriptures. The inward gaze also results in individuals resting on their own prowess for answers through personal experience and direct knowledge. An orange level of religious orientation is usually marked by the fact that the person's sphere of care and compassion expands to embrace the entire world. This worldcentric awareness induces a deep notion of universal tolerance. As one scholar points out, "tolerance begins when we no longer see a group as other but as a concrete human community with real and ancient values. This cognitive leap is a difficult one, especially when the cultural other happens to be a religious other." It is at this stage that rather than identifying with others because of race, religion, culture, or a belief system, the individual begins to see the underlying common connection that we all have as human beings. With this understanding comes the birth of and care for universal human rights.

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Table B.14 Integrative levels of religious orientation (Dustin DiPerna).

Level*	Characteristics
4. Pluralistic-relativistic (sensitive/green)	Signs or tests that demonstrate Fowler's conjunctive level of faith most often indicate a pluralistic level of religious orientation. The individual at this stage begins to realize that life's issues don't have to be black and white. The individual becomes comfortable with and may even enjoy the embrace of paradox. Pluralistic individuals recognize the deep truth that all traditions are simply different perspectives of the one Ultimate Reality. The religious pluralism expressed from this stage goes beyond the tolerance expressed in the rational stage to now actually take on a full embrace of other religious traditions. Individuals at this pluralistic level begin to recognize the cultural embeddedness of their own religious beliefs. As a result, they begin to search out other spiritual systems. They search not with a desire to convert those of other faiths but in order to take other perspectives, to find out how another's view may be able to supplement their own. They begin to ask questions: What areas of knowledge are missing in my own religious system? Do I have any blind spots? Just as red-colored spectacles make the viewer unable to see red, the conjunctive individual begins to examine other traditions to see what his particular set of spectacles may be preventing him or her from seeing. For the first time in development, religious experience is cross-referenced with those experiences described in other world traditions in a serious fashion that actually gives value to the experience of the other. The pluralistic individual begins to see that the deep structures of these experiences are similar (e.g., esoteric nondual realizations), despite the fact that surface features might appear different (merging with Christian God vs. merging with the Buddhist Dharmakaya). The individual at green altitude will show actions and behaviors that demonstrate a deep value for connection with other people. They find great significance not only in community but in the unity and equality of all people. With sensitivity to the needs of others, this stage begins to recognize that majority rule and democracy alone (if left unchecked) can end up imposing a tyranny of the majority on the minority. As a result this level values that everyone has an opportunity to speak and be heard. To decisions are made until all have come to some form of consensus. A feeling of interconnectedness often results in social activism in the world. Harvard professor Paul Hanson's "hermeneutic of engagement" or what he describes as the "interpretive method that ties study with worship and reflection with action in the world," although present at times in lower levels, becomes a necessity at a pluralistic level of development and beyond. All those concerned with social justice and global goodwill interpret their tradition in new ways so as to ensure positive social action in the world. Individuals at this stage, with their nuanced sensitivity to culture, identity, time, and place, tend to despise the broad universals and hierarchy that they often embraced in earlier mythic and rational stages. They often stand against such notions noting how dominating and repressive they can be. From this viewpoint, stages of development are disenchanting. There is a sense that "it is not right to value one level more than any other." It is in this stage that we see a clear confusion between dominating and healthy hierarchies. There is tendency at this stage to abandon hierarchies altogether. Through testing or observation one might see signs of ego development that exhibit individualistic or autonomous features. As individuals begin to reach these higher stages of ego development, they develop the desire to go beyond the limits of their own individuated self.

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Table B.14 Integrative levels of religious orientation (Dustin DiPerna).

Level*	Characteristics
5. Integral (comprehensive/turquoise)	At the integral stage of religious orientation one will likely notice signs of Fowler's universalizing stage of faith. Having taken the perspectives of other religious traditions, supplemented one's beliefs, and uprooted one's own worldview from the limiting perspectives of his or her own culture (to whatever degree possible), the individual at turquoise altitude begins to find a vast and sophisticated mental resting place. With the universalizing level of the primary indicator (faith) lit up, integral religious adherents have found a center within themselves with regard to their own personal beliefs. The search to find individual truth that began with ferociousness in the inquiry of the rational/orange stage, now starts to settle as the individual actually learns how to rest in and as truth itself. God (or Ultimate Reality) is seen as both immanent and transcendent, as Self and other. God is recognized from first-, second-, and third-person points of view. God/Godhead is seen, at least in part, as the causal ground from which all form and knowledge originally arise. The integral stage recognizes the importance and value of all preceding levels. For example, an integral level sees that green altitude served as a filter to neutralize all dominating tendencies. Passing through the pluralistic level ensures oppressive tendencies do not resurface when healthy, natural hierarchy returns at the integral stage. Beyond the primary indicator offered through faith development, secondary indicators may help to indirectly predict the orientation of an individual at this level of complexity. Through observation, one might look for actions or behaviors that demonstrate flex-flow and holistic/global values. With a clearer picture of the universe, the individual at this level of religious orientation will likely begin to demand more integrative open systems and forms of decision making by consent rather than majority rule or the time-consuming process of consensus. Religious adherents at this stage will likely agree to employ decisions quickly upon suggestion, unless there are substantial objections. The flex-flow nature of this level allows decisions to be implemented at an astonishing speed, because individuals are aware that course corrections can be made along the way. Integral religious orientation recognizes the importance of both equality and value distinctions. One has a deep desire to make sense of the world, to order it, and to organize the fields of knowledge that previously seemed disconnected. The individual is thirsty for knowledge and the experience of other religions, not only to supplement their own understanding, as in the pluralistic stage, but now to organize and help draw clear maps for other travelers to follow. Spirituality is no longer something that can be valued as an object, it is entirely embedded into every moment, making it impossible to avoid. Integral religious orientation is unique in that the individual now has a developmental perspective sensitive enough to implement hierarchy without domination or abuse. This perspective allows the individual to embrace all the levels of orientation that have come before it, from magic to mythic to rational to pluralistic. Integral religious orientation understands that the preceding levels serve as the vital foundational elements that support the higher stages. Without the lower levels of development, integral levels would not be possible. Trying to jettison lower levels of orientation would be like committing a slow but certain suicide. In fact, not only should lower levels not be destroyed, they should be embraced in agape, nurtured, and each stage made as healthy as possible. It is by way of these levels that the integral thinkers of tomorrow will blossom.

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Table B.14 Integrative levels of religious orientation (Dustin DiPerna).

Level*	Characteristics
	At turquoise altitude one may see signs of a moral development that has reached to the further limits of Kohlberg's post-conventional stages. One may notice that an individual at this level makes moral judgments in a more sophisticated way than those of the previous pluralistic stage wherein decisions are made considering the greatest good for the greatest number. At an integral level, decisions are made based on the greatest good for the greatest span and the *greatest depth*. Here, depth represents the degree of and potential for the highest levels of complexity and care (e.g., human beings all have greater capacity for complexity and care than an ant or a fish). A religious adherent with an integral level of awareness takes both span and depth into consideration when making ethical decisions. Because cognitive development is necessary but not sufficient for faith development to mature to the integral level, cognitive intelligence has expanded to Wilber's vision logic and Kegan's fifth order of consciousness. All perspectives are taken into consideration without privileging any single viewpoint. This allows a clearer picture of the whole to emerge, both within and outside of religious contexts. Signs may be observed at this stage that point to a level of ego development that Cook-Greuter dubs "unitive" or "ego-aware." In this stage, the religious adherent might show behavior and actions that demonstrate that the individual is no longer restricted to their own individual ego. There is a spaciousness that allows them to effortlessly glide between multiple perspectives and states of consciousness.

Source: Excerpted from DiPerna (2018, 78–84).

* Color code adopted from Wilber (2006), M.K.

Table B.15 Integrative levels of the self (Sean Esbjörn-Hargens and Michael E. Zimmerman).

Level*	Characteristics
First tier	
1. Symbiotic (infrared)	The *symbiotic self* is an individual who focuses entirely on surviving in an incomprehensible world. This level mainly pertains to infants, but perhaps also to some people who, in extreme situations, revert to this early level. People at this level are nonverbal and heavily dependent on others for care. The main task for the individual of this first stage is to construct a stable world of objects so as to separate from their surroundings.
2. Impulsive (magenta)	The *impulsive self* balances dichotomous forces such as good and evil. Mostly children and some adolescents occupy this level. Relatively few contemporary adults remain at this level of development. People at this level or altitude have a strong concern for creating safety and satisfying basic needs. They also have a sense of unlimited power combined with superstitious and magical notions. Their activity is often highly repetitive. Moreover, they view other people primarily as a source of self-gratification, and feel confused and made anxious by the complexity of the world. This is the beginning of the 1st-person perspective. At this altitude, the individual's impulses and needs are most important, and those needs are deeply influenced by their communities' time-honored rituals, taboos, superstitions, folkways, and lore. Mean magenta is the dark side of magenta, when blood oaths, ancient grudges, strong ethnic identification, and an impulsive readiness for violence (although often ritualized) prevail. Projection and introjection are their common defenses. Furthermore, few if any contemporary groups function primarily at this level.
3. Self-protective (red)	The *self-protective self* is impulsive, but impulsivity is now placed in the service of supporting an incipient self-structure, and not just to satisfy immediate needs and wants. Red individuals typically identify themselves in terms of will, ideas, and wishes. They project all their feelings and cannot yet self-reflect. Hence, overgeneralization is rampant. Seeing others as competitors for space, goods, and dominance, people operating at red have little capacity for explicit insight into self and others. Because they experience the world as a dangerous place filled with perilous risk, they often cross others' boundaries in a crusade of low trust and hypervigilance. At red, self-assertive individuals break free from constraint placed on them by group rituals and codes. Red selves vent their desires, demand respect and attention, hate being dissed, and experience no guilt or remorse for their actions. Examples include a child's temper tantrum, mercenaries, some epic heroes, warlords, the shipwrecked students depicted in *Lord of the Flies*, test pilots, and in some cases America's rugged individualistic mentality. People riding the red wave also possess the growing capacity to see the world more "realistically," that is, with fewer projected spirit forces and with greater distinction between self and other, including totem animals, and to direct their impulses into longer-term goals. Mean red dominate one's opponents, and make friends so long as they are useful. The consciousness associated with this altitude can be atavistic and gang-oriented, as it is in some urban areas where both amber and orange authority has broken down.

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Table B.15 Integrative levels of the self (Sean Esbjörn-Hargens and Michael E. Zimmerman).

Level*	Characteristics
4. Conformist (amber)	The *conformist self* is traditional, rule-oriented, and concerned with group membership. People whose center of gravity is at this level define themselves through others. They have no stable and clear boundaries between the self and the group. Displacement, reaction formation, and suppression are common defenses. They suppress negative feelings and overemphasize positive ones. They have a strong need to be accepted and to reject those who do not conform to group norms. They tend to view their world through a concrete-literal lens that includes concrete beliefs in many mythic realities. Clare Graves called this level "absolutistic." Despite such limitations, amber marks the beginning of a 2nd-person perspective in that the individual's own perspective (red) becomes subordinate to the groups perspective. Perhaps in reaction to the havoc wreaked by power-craving individuals, this level seeks to establish overarching values and truths that all must obey. At this stage people rely on sacred scripture, prophets, and similar inspired authority to discover meaning, purpose, and direction in life. Coercive social power enforces codes of conduct based on eternal, absolute principles. By controlling personal impulses and living righteously, people are guaranteed a future reward. Everyone must assume their proper place in the social hierarchy, at the top of which is an external authority whose commands must be obeyed. This authority can be God, the president, the king or queen, the czar, the leader, or the boss. Respect for the law and exercise of discipline are needed to build character and moral fiber. Examples of amber-mythic cultures include contemporary Singapore (Confucian culture in modern garb), Hasidic Judaism, the European Middle Ages, and contemporary evangelical Christian groups. As a premodern center of gravity, amber-mythic culture remains ethnocentric, even though sacred scripture often points the way toward a universalism. This universalism is misinterpreted as the universalism of their view: the one and true God.
5. Conscientious (orange)	The *conscientious self* emphasizes linear causality and objective thinking in the service of a newly emerging separate self-identity, which competes for autonomy, wealth, power, and status. People at orange have great independence and confidence. Although interested in their emotional life, they emphasize rationality. They associate with others who are also drawn to achieve through concision, efficiency, and efficacy. Still, they have a genuine interest in others, independent of their own needs and values. They experience the world as predictable and measurable. At this level, people develop the capacity to hold 3rd-person perspectives. That is, they can disidentify with their 1st-person (personal) perspective and with the 2nd-person (cultural) views, thereby gaining the ability to examine both self and culture from a 3rd-person, objective, "scientific" standpoint. At this stage of development culture moves from premodern to modern. The orange altitude advocates that people should act in their own self-interest. Liberal capitalism is the major sociopolitical expression of orange. Typically risk takers, optimistic, and self-reliant, orange moderns use strategy, technology, and competition to win. Despite their strong competitive streak, orange moderns are at least in principle worldcentric, as they demand that everyone be granted the same legal protections and access to markets. By positing universal human rights, orange took a giant step forward, even though centuries later not all humans have acquired such rights.

(continued)

Table B.15 Integrative levels of the self (Sean Esbjörn-Hargens and Michael E. Zimmerman).

Level*	Characteristics
6. Individualistic (green)	The *individualistic self* emphasizes connectivity between people especially by sharing experiences, acknowledging contextual aspects of relationships (e.g., gender, class, race), and systemic dynamics of reality. Paradoxically, because they are so sensitive to individual feelings they become strong advocates of community and egalitarianism. Also, because they are aware of the conditioning dynamics of culture and context, and because they take into account multiple viewpoints, those at the green level empathize with others and are willing to entertain alternative truth claims. Although they appreciate objectivity and logic, they tend to emphasize subjective and more holistic and organismic approaches to meaning-making. They value feelings and their expression. People operating at green condemn the greed and unhealthy materialism of orange individualism that can legitimate environmental destruction and social injustice. However, their hyperfocus on orange leaves them blind to the oftentimes worse injustices committed by red and amber, and when they do register these injustices they often mistakenly attribute them to orange. Greens promote an egalitarian agenda of justice, equity, and participation by all. Affirming consensus and eschewing hierarchy of all kinds, greens explore alternative forms of spirituality and more community-oriented lifestyles. Green egalitarianism leads to multiculturalism, which celebrates diversity, including the unique contributions, values, and beliefs of all cultures. Because of their worldcentrism, greens seem to complete what Habermas called the incomplete project of the Enlightenment, which defines modernity. In fact, however, greens are antimodern in some respects. Like all first-tier altitudes, green usually regards itself as the possessor of the truth and believes that other memes are deeply misguided. Hence, green often dislikes modern orange, thereby undercutting legitimate economic development. Green also frequently ignores or looks down upon traditional amber, thereby undermining the conventional foundations necessary for individual development and the communal solidarity important for many members of culture. Depth is a form of hierarchy, but green regards all hierarchy with suspicion. In its suspicion, it tends toward an egalitarianism that often tries to eliminate cultural depth in a way that mimics how natural science ignores nature's interior depth. This suspicion of hierarchy can lead green to uniquely unsupportable assertions, such as that there are no developmental levels, no evolution, and no progress. According to this philosophy, there is no better or worse (yet they hold their view as better than others and are thus trapped in a performative contradiction).

(continued)

Table B.15 Integrative levels of the self (Sean Esbjörn-Hargens and Michael E. Zimmerman).

Level*	Characteristics
Second tier	
7. Autonomous (teal)	The *autonomous self* welcomes chaos and multiple variables in the service of self-development. At this altitude, individuals understand that the self is embedded in many contexts and dimensions. They accept many aspects of self and integrate shadow material. They tolerate others in spite of their negative traits and differences of opinions or values. They experience their world as multidimensional with overlapping contexts and systems. Teal-holistic is the first stage of second tier. Here, people recognize the value of all previous levels as necessary for healthy human development. Respecting and seeking to integrate prior centers of gravity, rather than dissociate from them, teal is prepared to listen to everyone, to forge strategic alliances whenever possible, and to speak in ways that sincerely respect others. In Spiral Dynamics, Don Beck and Chris Cowan use the term "spiral wizard" to describe an individual at this level, as they are capable of interacting effectively with individuals and groups operating at different centers of gravity. Teal-holistic is committed to transdisciplinarity, to organize multiple perspectives in order to characterize and propose innovative solutions for complex problems. They display unusual leadership qualities. They neither seek nor shun the limelight, and take great satisfaction in service, especially in facilitating effective outcomes to which many different kinds of people have lent support. Individuals who operate at teal seek to reintegrate body and mind, emotion and reason, sense and soul, Descent and Ascent. Hence, teal-holistic is also called the centauric wave of development, involving a more integrated personhood. People at teal operate with vision-logic or "holistic aperspectivalism," a mode of consciousness that lets people understand, appreciate, and consider how things appear from several different, even conflicting perspectives.

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Table B.15 Integrative levels of the self (Sean Esbjörn-Hargens and Michael E. Zimmerman).

Level*	Characteristics
8. Integrated (turquoise)	Evolving to the *integrated self* wave helps alleviate teal's existential anxiety. At turquoise, the heart opens and increases the individual's awareness of the widespread suffering around the planet. The capacity for tolerating such suffering without being overwhelmed by it is a crucial aspect of the compassion that arises with the turquoise wave. Comprehending the extraordinary interpenetration of energy throughout all levels and domains of the Kosmos invites Ascent to nondual integralism. Here there is a marriage of wisdom and compassion, which allows turquoise-integral to apprehend that nothing needs to be done, because everything is already perfect, which in turn paradoxically serves as the basis for a profound commitment to action. Turquoise is connected to the Divinity penetrating all beings at all levels in all quadrants. Hence, people at turquoise remain centered and at ease, even while engaged in frequent and demanding acts. The despair that threatens teal-holistic is replaced by a profound, experientially based conviction that Eternity has always already interpenetrated the Finite. Recognizing that no manifestation, emanation, or creature endures forever, people at turquoise appreciate each moment for what it is, without clinging to ideas about how things ought to be. Turquoise-integral celebrates joy and shows compassion for suffering. Clearly, this developmental wave has not been fully stabilized on any wide cultural basis.

Source: Excerpted from Esbjörn-Hargens and Zimmerman (2009, 130–40, 236).

* Color code adopted from Wilber (2006), M.K.

Table B.16 Integrative levels of ecological identity (Sean Esbjörn-Hargens and Michael E. Zimmerman).

Level*	Characteristics	Examples
1. Eco-Guardian (magenta)	The Eco-Guardian is an impulsive self who connects with the cosmos by balancing good forces against evil dynamics. This self focuses on creating safety and satisfying basic needs. It has a sense of unbridled power mixed with superstitious and magical belief. Eco-Guardians view other people in light of self-gratification. The complexity of the world makes them uneasy. Very few adults have this exclusive identity, though many approaches to the environment, especially New Age and Romantic schools, make use of the content of this structure of identity. When applied to the natural environment, this self often focuses on returning to a lost ecological paradise. Sometimes the "Fall" from ecological grace is associated with horticulture (some deep ecologists), agriculture (some ecofeminists), or industrialization (some social ecologists). Eco-Guardians often emphasize magic or unseen forces. This approach is very "tribal" in that they place importance on ancestral ways; they hold naive animistic beliefs and maintain customs such as ceremonial rituals and rites of passage as important and a way to connect with the natural world. They appeal to the mystery of nature, especially through signs and omens. They respect councils, especially of elders, and lineage connections. Leadership is often based on age. Shamans and witches are seen as the gatekeepers of the world of Spirit.	*Aspects* of earth goddess groups; nature worship; totemism; eco-rituals; wicca; paradise lost perspectives; the cultural appropriation of indigenous practices; and some forms of deep ecology and ecofeminism.
2. Eco-Warrior (red)	Eco-Warriors are self-protective and self-serving. Their impulsive nature is now placed in service of supporting an idea of the self, rather than just the self's immediate needs and wants. People operating at this altitude often perform heroic acts, which serve to magnify their own status. They identify the self in terms of effort and preferences. Self-preservation is central. Their feelings are guarded and inaccessible. Overgeneralization is very common, with many judgments and simple ideas. They see others as competitors for space, goods, and dominance, and have little capacity for insight into self and others. Due to their lack of trust of others they are hypervigilant and bullying. For them the world is a risky game that can be quite dangerous. As such Eco-Warriors take a heroic approach to the environment. They focus on the assertion of the self over the system or nature. They are driven by impulsivity and immediate reward. Leaders establish themselves through power and strength. They often have a "to hell with others" attitude. They emphasize obtaining power and not being constrained. They desire respect and have an appreciation for the "law of the jungle" and "nature red in tooth and claw." They have a macho quality that feeds a heroic image of themselves as one person against everything. They highlight toughness and their groups are often ganglike. They value "hands on," "survival," and "street" skills. Various types of turf-wars are common for Eco-Warriors, and they experience minimal guilt.	*Aspects* of EarthFirst!; monkey wrenching; ecotage; ecoterrorism; the stoic mountain climber; extreme sports such as mountain biking, river kayaking, rock climbing; trophy and sports hunting; frontier mentalities; survival skills; off-the-grid housing; social Darwinism; and Warwick Fox's "desiring-impulsive self."

(continued)

Table B.16 Integrative levels of ecological identity (Sean Esbjörn-Hargens and Michael E. Zimmerman).

Level*	Characteristics	Examples
3. Eco-Manager (amber)	The Eco-Manager is a conformist self who is rule-oriented and concerned with group membership. Eco-Managers get their self-identity from others. It is hard for them to differentiate between themselves and the group. Projection and introjection are common defenses. Positive feelings are used to suppress negative ones. "Us" versus "them" drives their sense of group belonging. Their world is based on concrete-literal interpretations. Thus Eco-Managers take a stewardship approach to the environment. They focus on maintaining order and following the law, either the divine order or the laws of the state. They believe that order must be maintained to keep harmony and stability. They manage nature now so the future will hold nature's bounty. People follow a higher authority (God, the law, a political or religious leader) and comply with rules and regulations to avoid punishment. Leaders are those who have seniority or those who are in the rightful position. Honor and obedience are prized attributes. Justice and fairness are provided to those who follow the rules.	Examples of the Eco-Manager can include *aspects* of the Earth viewed as Garden of Eden; Puritan ethos; Boy and Girl Scouts; Environmental Protection Agency; environmental legislation; fish and game wardens; national and state parks; wildlife management; Endangered Species Act; Ducks Unlimited; and the Audubon Society.
4. Eco-Strategist (orange)	The Eco-Strategist is a conscientious self who is defined by an orientation toward scientific empiricism. This approach is placed in service of a newly emerging separate self-identity, which competes for wealth, influence, and social standing. This eco-self values independence and confidence. Eco-Strategists lead with rationality but are interested in their emotions. They emphasize efficiency and efficacy as a means for success. The world is viewed as being measurable and predictable. They value others for their own sake (e.g., supporting universal rights). The Eco-Strategist employs a rational approach to the environment. They use technology to enhance the standard of living. They emphasize progress and seek the "good life." They value autonomy and independence. Life is a game to be played and won. They measure success by financial achievement. There is a desire to make things better and to use competition to accomplish this. They highly value science and universal rights for humans, and embrace an opportunistic vision of the future. They respect the invisible hand of the economy.	Examples of the Eco-Strategist can include *aspects* of natural capitalism; conservationism; resourcism; the Lockean worldview; the science of ecology; deontological ethics; urban planning; utilitarian perspectives; environmental pragmatism; environmental psychology; behavioral approaches; industrial agriculture; and Warwick Fox's "rationalizing deciding self."

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Table B.16 Integrative levels of ecological identity (Sean Esbjörn-Hargens and Michael E. Zimmerman).

Level*	Characteristics	Examples
5. Eco-Radical (green)	The Eco-Radical is an individualistic self who highlights how we are all connected through similar experiences, shared contexts such as race or gender, and various systems (e.g., political and ecological). Eco-Radicals are sensitive to people's experiences and are willing to consider contradictory truth claims. They supplement objectivity and logic with subjective and more holistic approaches. They value personal experience and express feelings easily. Eco-Radicals take a postmodernist approach to the environment. They focus on the liberation of humans and animals from greed and domination. They promote community, unity, and sharing resources across class, gender, and racial divisions. They make an effort to explore the interiority of other people and beings and to connect with Spirit. They prize consensus as a way of making decisions and avoiding hurt feelings. They highlight participation and teamwork. They expect social responsibility, political correctness, sensitivity, and tolerance. Often the community comes before the individual. Socially engaged activism is used to overcome oppressive hierarchies and power structures.	*Aspects* of deep ecology; ecofeminism; social ecology; animal rights; biocentrism; ecocentrism; ecopsychology; environmental justice; green politics; David Abram's eco-phenomenology; the analysis of historical concepts; bioregionalism; various doomsayers and apocalyptic approaches; and the social construction of nature.
6. Eco-Holist (teal)	The Eco-Holist is an autonomous self who is comfortable amidst complexity. Eco-Holists recognize that individuals occupy multiple contexts. They embrace the many layers of self (including shadow material) through a complex psychology. They see the importance of various, even contradictory, values and perspectives and have a high tolerance of others' "negative" traits. Their world is multidimensional and dynamic. Eco-Holists approach the environment from a holistic-complex perspective. They focus on the dynamic systems that overlap in any given situation. They are capable of holding conflicting truths. The Eco-Holist demands a flexible, open system that allows for the full range of reality to express itself. There is an existential emphasis on being and personal responsibility. Hierarchies are replaced with holarchies. They grant leadership to those who can hold a multiplicity of perspectives. The diversities of people and perspectives are celebrated on their own terms. Eco-Holists see partial value in all perspectives. They use skillful means to meet people where they are. They understand complex systemic interactions. Chaos and complexity are valued and paradoxes are embraced. Nonlinear capacities are cultivated. Transparency becomes important.	*Aspects* of Félix Guattari's three ecologies; the new cosmology; Teilhard de Chardin's noosphere; the Gaia hypothesis; Gregory Bateson's ecology of mind; the system sciences of chaos and complexity; Charlene Spretnak's ecological post-modernism; Aldo Leopold's land ethic; sustainable development; Edgar Morin's complex thought; biodynamic agriculture.

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Table B.16 Integrative levels of ecological identity (Sean Esbjörn-Hargens and Michael E. Zimmerman).

Level*	Characteristics	Examples
7. Eco-Integralist (turquoise)	The Eco-Integralist wave addresses the existential anxiety of meaning associated with the Eco-Holist. For the Eco-Integralist the heart opens and increases the individual's capacity to feel the widespread suffering around the planet. This capacity for remaining open to such suffering without being consumed by it is an important quality of the compassion that emerges with this Eco-Self. Wilber has captured this paradox with the phrase "hurts more, bothers you less." The Eco-Integralist is deeply committed to the integration of transcendence and innocence. This is a marriage of wisdom and compassion, which recognizes that nothing needs to be done, because everything is always already perfect. The Eco-Integralist perceives the luminous nature of all life forms and manifestations. Thus, individuals at this altitude have the capacity to stay open and relaxed even while involved in arduous tasks. This eco-self has ongoing access to the experiential insight that the manifest realm is Divinized. The Eco-Integralist recognizes that no ecological reality lasts forever, thus they appreciate each phenomenon, without clinging to a view of how it should be but working hard to change things for the better.	*Aspects* of Bhutan's "Middle Path" to development; Brian N. Tissot's work with marine fisheries in Hawai'i; Michael Zimmerman's environmental philosophy; Darcy Riddell's ecoactivism in Canada's Great Bear Rainforest; Brian Eddy's Integral Geography; Cameron Owens's analysis of waste reduction in Calgary.
8. Eco-Sage (indigo)	This level of development is rarely stably reached (less than 1% of the U.S. population). This level corresponds to both Susanne Cook-Greuter's ego-aware self, and the unitive self. The Eco-Sage is an ego-aware self who integrates multimodal and multidimensional elements across contexts in the service of humanity. Eco-Sages are aware of the subtle ways the ego filters experience. They recognize paradox and the limits of "mapping." They desire to work through their own limits and blind spots and increase their capacity to witness themselves in the moment. They understand others in developmental terms and encounter them without judgment. They have a profound understanding of others' complex and dynamic personalities. They experience the world as a place full of potential and paradox. At this stage the environmental identity becomes even more of a transparent manifestation of Being, completely spontaneous and open. They have stable access to transpersonal realities such as the capacity to witness their experience and keep their boundaries open. They view others as manifestations of Being-Spirit.	*Aspects* of transcendentalism; J. W. Goethe's *Urpflanze*; St. Francis of Assisi's Canticle of Brother Sun; Ken Wilber's Eco-Noetic Self; Joanna Macy's ecological self; Chris Bache's species mind; some neo-pagans; nondual spiritual activism; McClellan's nondual ecology; and Warwick Fox's "transpersonal-ecological self."

Source: Excerpted from Esbjörn-Hargens and Zimmerman (2009, 227–37).

* Color code adopted from Wilber (2006), M.K.

Table B.17 Integrative levels of faith (James W. Fowler and Mary L. Dell).

Level	Characteristics
1. Primal	*Infancy to age 2* In this first stage a prelanguage disposition of trust forms in the mutuality of one's relationships with parents and other caregivers. This sense of trust offsets the inevitable anxiety and mistrust that result from the succession of cognitive and emotional experiences of separation and self-differentiation, which occur during infant development. Experiences combining to form this trusting disposition include body contact and care; vocal and visual interplay; ritualized interactions associated with early play, feeding, and tending; and the development of interpersonal affective attunement in the infant's relations with caregivers. Factors such as these others, for forming bonds of attachment with them, and for shaping a disposition to trust the larger value and meaning commitments conveyed in parental care. Anxiety and mistrust have their own developmental pattern of emergence that caregivers' consistency and dependability help to offset activate prepotentiated capacities for finding coherence and reliability in self and primal others, for forming bonds of attachment with them, and for shaping a disposition to trust the larger value and meaning commitments conveyed in parental care. Anxiety and mistrust have their own developmental pattern of emergence that caregivers' consistency and dependability help to offset.
2. Intuitive-projective	*Toddlerhood and early childhood* Children attempt to form images that can hold and order the mixture of feelings and impressions evoked by their encounters with the newness of both everyday reality and the penumbra of mystery that surrounds and pervades it. Death becomes a conscious focus as a source of danger and mystery. Experiences of power and powerlessness orient children to a frequently deep existential concern about questions of security, safety, and the power of those on whom they rely for protection. Owing to naive cognitive egocentrism, children do not consistently differentiate their perspectives from those of others. Lacking simple perspective taking and the ability to reverse operations, young children may not understand cause-and-effect relations well. They construct and reconstruct events in episodic fashion. Fantasy and makebelieve are not distinguished from factuality. Constructions of faith are drawn to symbols and images of visible power and size. Stories that represent the powers of good and evil in unambiguous fashion are prized; they make it possible for children to symbolize and acknowledge the threatening urges and impulses that both fascinate and disturb them, while providing an identification with the vicarious triumphs of good over evil that such stories as fairy tales can provide. There is in this stage the possibility of aligning powerful religious symbols and images with deep feelings of terror and guilt, as well as of love and companionship. Such possibilities give this stage the potential for forming deep and long-lasting emotional and imaginal orientations—both for good and for ill.

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Table B.17 Integrative levels of faith (James W. Fowler and Mary L. Dell).

Level	Characteristics
3. Mythic-literal	*Middle childhood and beyond* In the mythic-literal stage, the child, adolescent, or adult does not yet construct the interiority—the feelings, attitudes, and internal guiding processes—of the self or others. That is to say, 10-year-olds do not yet reliably have their feelings. They are involved in the process of learning to recognize, interpret, and manage strong feelings and impulses. Similarly, they do not construct God in particularly personal terms, or attribute to God highly differentiated internal emotions and interpersonal sensitivities. In making sense of the larger order of things, therefore, this stage typically structures the ultimate environment—the cosmic pattern of God's rule or control of the universe—along the lines of simple fairness and moral reciprocity. God is often constructed on the model of a consistent and caring, but just, ruler or parent. In this stage one often sees a sense of cosmic fairness at work: The child believes that goodness is rewarded and badness is punished. In shaping meanings the mythic-literal child primarily employs narrative. In this respect, this stage provides a permanent contribution to meaning making. Stories are as close as the mythic-literal stage comes to reflective synthesis. Neither children nor adolescents (or adults) of this stage carry out extensive analytic or synthetic reflection on their stories. They offer narratives from the middle of the flowing streams of their lives. They do not "step out on the banks" to reflect on where the streams have come from, where they are going, or on what larger meanings might give connection and integrated intelligibility to their collection of experiences and stories. In this stage the use of symbols and concepts remains largely concrete and literal. The mythic-literal stage begins to wane with the discovery that ours is not a "quick-payoff universe"; that is, evil or bad persons do not necessarily suffer for their transgressions, at least in the short run. And often, "bad things happen to good people." We have coined the term "11-year-old atheists" for children who, in having this latter experience, temporarily or permanently give up belief in a God built along the lines of simple cosmic moral retribution.

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Table B.17 Integrative levels of faith (James W. Fowler and Mary L. Dell).

Level	Characteristics
4. Synthetic-conventional	*Adolescence and beyond* Personality, both as style and substance, becomes a conscious issue. From within this stage youth construct the ultimate environment in terms of the personal. God representations can be populated with personal qualities of accepting love, understanding, loyalty, and support during times of crisis. During this stage youths develop attachments to beliefs, values, and elements of personal style that link them in con-forming (forming with) relations with the most significant others among their peers, family, and other nonfamily adults. Identity, beliefs, and values are strongly felt, even when they contain contradictory elements. They tend, however, to be espoused in tacit, rather than explicit, formulations. At this stage one's ideology or worldview is lived and asserted; only gradually does it become a matter of critical and reflective articulation. Where earlier deficits in the self and in one's patterns of object relations have not been worked through and healed, they become factors that can inhibit the use of cognitive abilities in the tasks of identity and ideology construction in adolescence. Frequently we see splits between the emotional and cognitive functioning of adolescents or adults that are directly attributable to such unresolved issues and relations from early childhood. Sometimes the potential of God as a constructive self-object must be jettisoned because God can only be emotionally populated with the shaming or narcissistic qualities growing out of our experiences with our earliest and most salient object relations. One decisive limit of the synthetic-conventional stage is its lack yet of third-person perspective taking—a lack of the capacity to construct and work from a perspective that holds both self and other in the same frame, and provides a basis for growing objectivity regarding interpersonal relationships. This means that in its dependence on significant others for confirmation and clarity about one's identity and meaning to them, the synthetic-conventional self does not yet have a third-person perspective from which it can see and evaluate self–other relations from a viewpoint outside themselves. In the synthetic-conventional stage the young person or adult can remain trapped in the "Tyranny of the They"—that is, an overdependence on the mirroring and evaluations of influential significant others.
5. Individuative-reflective	Two significant indicators mark the individuative-reflective stage. First, one must develop the ability to reflect critically on the values, beliefs, and commitments one subscribed to as part of constructing the previous stage, the synthetic-conventional. This reexamination of deeply held beliefs can be a painful process. Second, one must struggle with developing a self-identity and self-worth capable of independent judgment in relation to the individuals, institutions, and worldview that anchored one's sense of being up until that time. Questions representative of this stage include: Who am I when I am not defined primarily as someone's daughter, son, or spouse? Who am I apart from my educational, occupational, or professional identity? Who am I beyond my circle of friends or familiar community? In constructing the individuative-reflective position, inherited or familiar symbols, creeds, beliefs, traditions, and religious trappings are scrutinized, and those of other faiths and traditions may be evaluated for what they might have to offer. This testing applies, as well, to secular value systems, worldviews, and the circles that espouse them. In the end, the familiar and traditional beliefs and practices may not be rejected or discarded, but if they are retained, they are held with more self-aware clarity and intentional choice.

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Table B.17 Integrative levels of faith (James W. Fowler and Mary L. Dell).

Level	Characteristics
6. Conjunctive	The conjunctive stage is characteristic of a reflective adult thinker who recognizes that truths of all kinds can be approached from multiple perspectives and that faith must balance and maintain the tensions between those multiple perspectives. This stage makes sense out of paradoxes. In Christianity, for instance, God is seen as all-powerful and yet God limits the divine expression of power in granting humans agency and freedom. And though the sovereign of history, God took on the humble and lowly form of a human man who permitted himself to be put to death at the hands of other humans. This knowledge and faith build on necessary paradox and tensional, complex trust and commitment. Individuals in the conjunctive stage express a principled interest in and openness to truths of other cultural and religious traditions, and believe that dialogue with those different others may lead to deepened understandings and new insights into their own traditions and beliefs. Other paradoxes that are dealt with in this stage include the realities that one is both old and young, with both masculine and feminine qualities, conscious and unconscious, and intentionally constructive and well-meaning while at the same time being unintentionally destructive in some aspects of life and community membership. One is both singular and individuated, yet has an increased awareness of being dependent on and in interdependent solidarity with both friends and strangers. This results in the desire for new ways to relate to God, others, and self.
7. Universalizing	In this review of faith stages, we note that the circle of "people who count" has in each stage expanded, so that by the time one reaches the universalizing stage, one is concerned about creation and being as a whole, regardless of nationality, social class, gender, age, race, political ideology, and religious tradition. In this ultimate stage of faith, the self is drawn out of its own self-limits into a groundedness and participation in one's understanding of the Holy. Those once seen as enemies may be understood also to be children of God and deserving of unconditional love. Evil of all kinds is opposed nonviolently, leading to activism that attempts to change adverse social conditions as an expression of that universal regard for all life that emanates from God's love and justice. While persons of universalizing faith continue to be human, with common shortcomings and inconsistencies, they are exceptional in the strength of their passion that all creation should manifest God's goodness and that all humanity be one in peace. In their boldness to live out the convictions of their faith, they are both freeing and threatening to the rest of us. Relatively few individuals claim this level of vision and faith-related action. Among those exceptional figures most would agree manifested or manifest the universalizing stage are Mohandas Gandhi, Mother Teresa, the Reverend Dr. Martin Luther King Jr., and, perhaps some would say, former U.S. president Jimmy Carter, Archbishop Desmond Tutu, and anti–death penalty activist Sister Helen Prejean.

Source: Excerpted from Fowler and Dell (2006, 36–42).

Table B.18 Integrative levels of communicative action (Jürgen Habermas).

Level	General structures of communicative action					Qualifications of role behavior		
	Cognitive presuppositions	*Level of interaction*	*Action level*	*Action motivation*	*Actors*	*Perception of norms*	*Perception of motives*	*Perception of actors*
1.	Preoperational thought	Incomplete interaction	Concrete actions and consequences of action	Generalized pleasure/pain	Natural identity	Understand and follow behavioral expectations	Express and fulfill action intentions (wishes)	Perceive concrete actions and actors
2.	Concrete-operational thought	Complete interaction	Roles, systems of norms	Culturally interpreted needs	Role identity	Understand and follow reflexive behavioral expectations (norms)	Distinguish between "ought" and "want" (duty/inclination)	Distinguish between actions and norms, individual subjects and role bearers
3.	Formal-operational thought	Communicative action and discourse	Principles	Competing interpretation of needs	Ego identity	Understand and apply reflexive norms (principles)	Distinguish between heteronomy and autonomy	Distinguish between particular and general norms, individuality and ego in general

Source: Based on Habermas (1979, 83: Schema 3).

Table B.19 Integrative levels of interactive competence and moral consciousness (Jürgen Habermas).

Level	Role competence			Moral consciousness		
	Communication		*Reciprocity requirement*	*Idea of the good life*	*Domain of validity*	*Philosophical reconstruction*
1.	Action and consequences of action	Generalized pleasure/pain	Incomplete reciprocity	Maximization of pleasure—avoidance of pain through obedience	Natural and social environment	
2.			Complete reciprocity	Maximization of pleasure—avoidance of pain through exchange of equivalents		Naive hedonism
3.	Roles	Culturally interpreted needs	Incomplete reciprocity	Concrete morality of primary groups	Group of primary reference persons	
4.	Systems of norms	(concrete duties)		Concrete morality of secondary groups	Members of political community	Concrete thought in terms of a specific order
5.	Principles	Universalized pleasure/pain (utility)	Complete reciprocity	Civil liberties, public welfare	All legal associates	Rational natural law
6.		Universalized duties		Moral freedom	All humans as private persons	Formalistic ethics
7.		Universalized need interpretations		Moral and political freedom	All as members of fictive world society	Universal ethics of speech

Source: Based on Habermas (1979, 89: Schema 4).

Table B.20 Integrative levels of ego identity (Jürgen Habermas).

Level	Characteristics
1. Symbiotic	During the first year of life we can find no clear indicators for a subjective separation between subject and object. Apparently in this phase the child cannot perceive its own corporeal substance as a body, as a boundary-maintaining system. The symbiosis between child, reference person, and physical environment is so intimate that we cannot meaningfully speak of a demarcation of subjectivity in the strict sense.
2. Egocentric	In the next segment of life, which corresponds with Piaget's sensory-motor and preoperative phases of development, the child succeeds in differentiating between self and environment. It learns to perceive permanent objects in its environment, but without yet clearly differentiating the environment into physical and social domains. Moreover, the demarcation (of the self) in relation to the environment is not yet objective. This can be seen in manifestations of cognitive and moral egocentrism. The child cannot perceive, understand, and judge situations independently of its own standpoint—it thinks and acts from a body-bound perspective.
3. Sociocentric-objectivistic	With the onset of the stage of concrete operations the child takes the decisive step toward constructing a system of demarcations; it now differentiates between perceptible and manipulable things and events, on the one hand, and understandable action-subjects and their utterances, on the other; and it no longer confuses linguistic signs with the reference and meaning of symbols. In becoming aware of the perspectival character of its own standpoint, it learns to demarcate its subjectivity in relation to external nature and society. With the seventh year, more or less, pseudo-lying ceases—an indication that distinctions are made between fantasies and perceptions, impulses and obligations. At close of this phase, cognitive development has led to an objectivation of external nature, linguistic-communicative development to the mastery of a system of speech acts, and interactive development to the complementary connection of generalized expectations of behavior.
4. Universalistic	Only with adolescence can the youth succeed in progressively freeing himself from the dogmatism of the preceding phase of development. With the ability to think hypothetically and to conduct discourses, the system of ego-demarcations becomes reflective. Until then the epistemic ego, bound to concrete operations, confronted an objectivated nature; and the practical ego, immersed in group perspectives, was dissolved in quasi-natural systems of norms. But when the youth no longer naively accepts the validity claims contained in assertions and norms, he can transcend the objectivism of a given nature and, in the light of hypotheses, explain the given from contingent boundary conditions; and he can burst the sociocentrism of a traditional order and, in the light of principles, understand (and if necessary criticize) existing norms as mere conventions. To the extent that the dogmatism of the *given* and the *existing* is broken, the pre-scientifically constituted object domains can be relativized in relation to the system of ego-demarcations so that theories can be traced back to the cognitive accomplishments of investigating subjects and norm systems to the will-formation of subjects living together.

Source: Excerpted from Habermas (1979, 100–102).

Table B.21 Integrative levels of interaction, social perspective, and moral judgment (Jürgen Habermas).

Level	Type of action	Cognitive structures						
		Perspective structure	*Structure of behavioral expectations*	*Concept of authority*	*Concept of motivation*	*Social perspective (perspective)*	*(justice concept)*	*Moral stage*
1. Preconventional	Interaction controlled by authority	Reciprocal interlocking of action perspective	Particular behavior pattern	Authority of reference persons: externally sanctioned will	Loyalty to reference persons: orientation toward rewards and punishments	Egocentric perspective	Complementarity of order and obedience	Stage 1
	Cooperation based on self-interest						Symmetry of compensation	Stage 2
2. Conventional	Role behavior	Coordination of observer and participant perspectives	Group-wide generalization of behavior patterns: social roles	Internalized authority of supraindividual will (*Willkür*): loyalty	Duty vs. inclination	Primary-group perspective	Conformity to roles	Stage 3
	Normatively governed interaction		Group-wide generalization of roles: system of norms	Internalized authority of an impersonal collective will (*Wille*): legitimacy		Perspective of collectivity (the systems's point of view)	Conformity to the existing system of norms	Stage 4

(continued)

Table B.21 Integrative levels of interaction, social perspective, and moral judgment (Jürgen Habermas).

Level	Type of action	Cognitive structures						
		Perspective structure	*Structure of behavioral expectations*	*Concept of authority*	*Concept of motivation*	*Social perspective (perspective)*	*(justice concept)*	*Moral stage*
3. Post-conventional	Discourse	Integration of speaker and world perspectives	Rules for testing norms: principles	Ideal vs. social validity	Autonomy vs. heteronomy	Principled perspective (prior to society)	Orientation toward principles of justice	Stage 5
			Rules for testing principles: a procedure for justifying norms			Procedural perspective (ideal role taking)	Orientation toward procedures for justifying norms	Stage 6

Source: Based on Habermas (1990, 166: Table 4).

Table B.22 Integrative levels of leadership agility (Bill Joiner).

Level	View of leadership	Pivotal conversations	Leading teams	Organizational change
Heroic (conventional)				
1.Expert (ca. 45%)*	Tactical, problem-solving *orientation.* Believes that leaders are respected and followed by others because of their authority and expertise.	Style is either to strongly assert opinions or hold back to accommodate others. May swing from one style to the other for different situations and relationships. Tends to avoid giving or requesting feedback.	More of a supervisor than a manager. Creates a group of individuals rather than a team. Work with direct reports is primarily one-on-one. Too caught up in the details of own work to lead in a strategic manner.	Organizational initiatives focus primarily on incremental improvements inside unit boundaries with little attention to stakeholders.
2. Achiever (ca. 35%)	*Strategic, outcome orientation.* Believes that leaders motivate others by making it challenging and satisfying to contribute to larger objectives.	Primarily assertive or accommodative with some ability to compensate with the less preferred style. Will accept or even initiate feedback, if helpful in achieving desired outcomes.	Operates like a full- fledged manager. Meetings to discuss important strategic or organizational issues are often orchestrated to gain buy-in to own views.	Organizational initiatives include analysis of external environment. Strategies to gain stakeholder buy-in range from one-way communication to soliciting input.
Post-heroic (postconventional)				
3. Catalyst (ca. 5%)	*Visionary, facilitative orientation.* Believes that leaders articulate an innovative, inspiring vision and bring together the right people to transform the vision into reality. Leaders empower others and actively facilitate their development.	Adept at balancing assertive and accommodative style as needed in particular situations. Likely to articulate and question underlying assumptions. Genuinely interested in learning from diverse viewpoints. Proactive in seeking and utilizing feedback.	Intent upon creating a highly participative team. Acts as a team leader and facilitator. Models and seeks open exchange of views on difficult issues. Empowers direct reports. Uses team development as a vehicle for leadership development.	Organizational initiatives often include development of a culture that promotes teamwork, participation, and empowerment. Proactive engagement with diverse stakeholders reflects a belief that input increases the quality of decisions, not just buy-in.

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Table B.22 Integrative levels of leadership agility (Bill Joiner).

Level	View of leadership	Pivotal conversations	Leading teams	Organizational change
4. Co-Creator (ca. 4%)	*Oriented toward shared purpose and collaboration*. Believes leadership is ultimately a service to others. Leaders collaborate with other leaders to develop a shared vision that each experiences as deeply purposeful.	Integrates his/her assertive and accommodative sides in pivotal conversations and is agile in using both styles. Able to process and seriously consider negative feedback even when highly charged emotionally.	Develops a collaborative leadership team, where members feel full responsibility not only for their own areas but also for the unit/organization they collectively manage. Practical preference for consensus decision making but doesn't hesitate to use authority as needed.	Develops key stakeholder relationships characterized by deep levels of mutual influence and genuine dedication to the common good. May create companies or organizational units where corporate responsibility and deep collaboration are integral practices.
5. Synergist (ca. 1%)	*Holistic orientation.* Experiences leadership as participation in a palpable life purpose that benefits others while serving as a vehicle for personal transformation.	Centered within his/her assertive and accommodative energies, expressed appropriately to the situation. Cultivates a present-centered awareness that augments external feedback and supports a strong, subtle connection with others, even during challenging conversations.	Capable of moving fluidly between various team leadership styles uniquely suited to the situation at hand. Can shape or amplify the energy dynamics affecting team performance to bring about mutually beneficial results.	Develops and maintains a deep, empathetic awareness of conflicting stakeholder interests, including his/her own. Able to access synergistic intuitions that transform seemingly intractable conflicts into solutions beneficial for all parties involved.

Source: Based on Joiner (2011, 136-138: Table 9.2).

* Estimated percentage of managers currently capable of operating at each ability level.

Table B.23 Integrative levels of self (Robert Kegan).

Level	Characteristics
0. Incorporative	Piagetian and psychoanalytic psychologies share a conception of the newborn's state. Both consider the newborn to live in an objectless world, a world in which everything sensed is taken to be an extension of the infant, where out of sight (or touch or taste or hearing or smell) can mean out of existence. Taken at a general level, the notion of "orality" is consistent with the Piagetian conception of the all-assimilative, incorporative newborn. Both perspectives see the central psychological achievement of the first eighteen months in terms of an end to this objectless world and the dawn of object relations.
1. Impulse	In disembedding herself from her reflexes the two-year-old comes to have reflexes rather than be them, and the new self is embedded in that which coordinates the reflexes, namely, the "perceptions" and the "impulses." The tremendous lability, cognitive and emotional, of the preschool child is suggested to be a function of this new embeddedness. This child is able to recognize objects separate from herself, but those objects are *subject to* the child's perception of them (this is, I suggest, the underlying structure of Piaget's preoperational stage). If the child's perception of an object changes, the object itself has changed, in the child's experience.
2. Imperial	One way of characterizing the new subject-object relation is in terms of the construction of the role. This is true whether we are speaking of the social-cognitive capacity to take the role of another person, or the affective differentiation within the impulse life of the family, which permits me to take my appropriate role as a "child" in relation to a "parent" rather than *being* my impulse life bound up with another. With the constitution of the enduring disposition (the "needs"), there comes as well the emergence of a self-concept. With the capacity to take command of one's impulses (to have them, rather than being them) can come a new sense of freedom, power, independence—agency, above all. When you are the object of my stage 2 balance you are subject to my projecting onto you my own embeddedness in my needs. I constitute you as that by which I either do, or not, meet my needs, fulfill my wishes, pursue my interests. Instead of seeing my needs I see through my needs.
3. Interpersonal	In the interpersonal balance the feelings the self gives rise to are, a priori, shared; somebody else is in there from the beginning. The self becomes conversational. To say that the self is located in the interpersonal matrix is to say tat it embodies a plurality of voices. Its strength lies in its capacity to be conversational, freeing itself of the prior balance's frenzy-making constant charge to find out what the voice will say on the other end. But its limit lies in its inability to consult itself about that shared reality. It cannot because it *is* that shared reality. My stage 3 ambivalence or personal conflicts are not really conflicts between what I want and what someone else wants. When looked into they regularly turn out to be conflicts between what I want to do as a part of this shared reality and what I want to do as part of that shared reality. To ask someone in this evolutionary balance to resolve such a conflict by bringing both shared realities before herself is to name precisely the limits of this way of meaning making. "Bringing before oneself" *means* not being subject to it, being able to take it as an object, just what this balance cannot do.

(continued)

Table B.23 Integrative levels of self (Robert Kegan).

Level	Characteristics
4. Institutional	In separating itself from the context of interpersonalism, meaning-evolution authors a self which maintains a coherence across a shared psychological space and so achieves an identity. This authority—sense of self, self-dependence, self-ownership—is its hallmark. In moving from "I am my relationships" to "I have relationships," there is now somebody who is doing this having, the new I, who, in coordinating or reflecting upon mutuality, brings into being a kind of psychic institution (*in + statuere*: to set up; *statutum*: law, regulation; as in "statute" and "state"). A strength of this is the person's new capacity for independence, to own herself, rather than having all the pieces of herself owned by various shared contexts; the sympathies which arise out of one's shared space are no longer determinative of the "self," but taken as preliminary, mediated by the self-system. But in this very strength lies a limit. The "self" is identified with the organization it is trying to run smoothly; it *is* this organization. The "self" at ego stage 4 is an administrator in the narrow sense of the word, a person whose meanings are derived out of the organization, rather than deriving the organization out of her meaning/principles/purposes/reality. Stage 4 has no "self," no source," no "truth" before which it can bring the operational constraints of the organization, because its "self," its "source," its "truth" is invested within these operational constraints. In this sense, ego stage 4 is inevitably ideological (as Erikson recognized must be the case for identity formation), a truth for a faction, a class, a group.
5. Interindividual	The rebalancing that characterizes ego stage 5 separates the self from the institution and creates, thus, the "individual," that self who can reflect upon, or take as object, the regulations and purposes of a psychic administration which formerly was the subject of one's attentions. "Moving over" the institutional from subject to object frees the self from that displacement of value whereby the maintenance of the institution has become the end in itself; there is now a self who runs the organization, where before there was a self who *was* the organization; there is now a source before which the institutional can be brought, by which it is directed, where before the institution was the source. The capacity to coordinate the institutional permits one now to join others not as fellow-instrumentalists (ego stage 2) nor as partners in fusion (ego stage 3), nor as loyalists (ego stage 4), but as individuals—people who are known ultimately in relation to their actual or potential recognition of themselves and others as value-originating, system-generating, history-making individuals. The community is for the first time a "universal" one in that all persons, by virtue of their being persons, are eligible for membership.

Source: Excerpted from Kegan (1982, 78–104).

Table B.24 Integrative levels of consciousness and curricular complexity in history (Robert Kegan).

Level	Underlying structure	Cognitive	Interpersonal	Intrapersonal	Curricular form (history)	Appropriate audience
1. Order	Independent elements	*Perceptions (fantasy)*	*Social perceptions*	*Impulses*		
2. Order	Durable categories	*Concrete (actuality)* Data, cause-and-effect	*Point of view* Role-concept, simple reciprocity (tit for tat)	*Enduring dispositions* Needs, preferences, self concept	*The story of history* The *concrete facts* and the *narrative line* (e.g., the "story" of "settling the West" or "how the world went to war")	*School children* Grades 1–3 (a stretch), grades 4–6 (elaborating an emerging capacity)
3. Order (traditionalism)	Cross-categorical structures	*Abstractions (ideality)* Role-concept, simple reciprocity	*Mutuality, interpersonalism* Rule consciousness, mutual reciprocity	*Inner states* Subjectivity, self-consciousness	*Elementary historiography* *How* history is written; its dependence on the perspective of the historian; the themes and values expressed in "a history" of given events	*Adolescents* Junior high students (a stretch), high school students (elaborating an emerging capacity)
4. Order (modernism)	Complex systems	*Abstract systems (ideology)* Formulation, authorization, relations between abstractions	*Institution* Relationship-regulating forms, multiple-role consciousness	*Self-authorship* Self-regulation, self-formation, identity, autonomy, individuation	*Historical theory* The discipline's system or systems for creating historical knowledge, generating, regarding, evaluating, and relating inferences	*Adults* Any higher education setting (a stretch for many)

(continued)

Table B.24 Integrative levels of consciousness and curricular complexity in history (Robert Kegan).

Level	Underlying structure	Cognitive	Interpersonal	Intrapersonal	Curricular form (history)	Appropriate audience
5. Order (post-modernism)	Trans-system structures	*Dialectical (trans-ideological/post-ideological)* Testing formulation, paradox, contradiction	*Inter-institutional* Relationship between forms, interpenetration of self and other	*Self-transformation* Interpenetration of selves, inter-individuation	*Critical theory* Critical reflection on the discipline itself; subjecting its prevailing theories to analysis not just from the perspective of another contending theory but from a perspective "outside" ideology	*Adults* Any higher education setting (a stretch for most); graduate programs in history profession itself (a stretch for many)

Source: Based on Kegan (1994, 291, 314–15: Tables 8.1, 9.1).

Table B.25 Integrative levels of reflective judgment (Patricia M. King and Karen S. Kitchener).

Level	View of knowledge	Concept of justification	Typical expression
Pre-reflective thinking			
1.	Knowledge is assumed to exist absolutely and concretely; it is not understood as an abstraction. It can be obtained with certainty by direct observation.	Beliefs need no justification since there is assumed to be an absolute correspondence between what is believed and what is true. Alternate beliefs are not perceived.	*"I know what I have seen."*
2.	Knowledge is assumed to be absolutely certain but not immediately available. Knowledge can be obtained directly through the senses (as in direct observation) or via authority figures.	Beliefs are unexamined and unjustified or justified by their correspondence with the beliefs of an authority figure (such as a teacher or parent). Most issues are assumed to have a right answer, so there is little or no conflict in making decisions about disputed issues.	*"If it is on the news, it has to be true."*
3.	Knowledge is assumed to be absolutely certain or temporarily uncertain. In areas of temporary uncertainty, only personal beliefs can be known until absolute knowledge is obtained. In areas of absolute certainty, knowledge is obtained from authorities.	In areas in which certain answers exist, beliefs are justified by reference to authorities' views. In areas in which answers do not exist, beliefs are defended as personal opinion since the link between evidence and believes is unclear.	*"When there is evidence that people can give to convince everybody one way or another, then it will be knowledge; until then, it's just a guess."*
Quasi-reflective thinking			
4.	Knowledge is uncertain and knowledge claims are idiosyncratic to the individual since situational variables (such as incorrect reporting of data, data lost over time, or disparities in access to information) dictate that knowing always involves an element of ambiguity.	Beliefs are justified by giving reasons and using evidence, but the argument and choice of evidence are idiosyncratic (for example, choosing evidence that fits an established belief).	*"I'd be more inclined to believe evolution if they had proof. It's just like the pyramids: I don't think we'll ever know. Who are you going to ask? No one was there."*

(continued)

Table B.25 Integrative levels of reflective judgment (Patricia M. King and Karen S. Kitchener).

Level	View of knowledge	Concept of justification	Typical expression
5.	Knowledge is contextual and subjective since it is filtered through a person's perceptions and criteria for judgment. Only interpretations of evidence, events, or issues may be known.	Beliefs are justified within a particular context by means of rules of inquiry for that context and by context-specific interpretations of evidence. Specific beliefs are assumed to be context specific or balanced against other interpretations, which complicates (and sometimes delays) conclusions.	*"People think differently and so they attack the problem differently. Other theories could be as true as my own, but based on different evidence."*
Reflective thinking			
6.	Knowledge is constructed into individual conclusions about ill-structured problems on the basis of information from a variety of sources. Interpretations that are based on evaluations of evidence across contexts and on evaluated opinions or reputable others can be known.	Beliefs are justified by comparing evidence and opinion from different perspectives on an issue or across different contexts and by constructing solutions that are evaluated by criteria such as the weight of the evidence, the utility of the solution, or the pragmatic need of action.	*"It's very difficult in this life to be sure. There are degrees of sureness. You come to a point at which you are sure enough for a personal stance on the issue."*
7.	Knowledge is the outcome of a process of reasonable inquiry in which solutions to ill-structured problems are constructed. The adequacy of those solutions is evaluated in terms of what is most reasonable or probable according to the current evidence, and it is reevaluated when relevant new evidence, perspectives, or tools of inquiry become available.	Beliefs are justified probabilistically on the basis of a variety of interpretative considerations, such as the weight of the evidence, the explanatory value of the interpretation, the risk of erroneous conclusions, consequences of alternative judgments, and the interrelationships of these factors. Conclusions are defended as representing the most complete, plausible, or compelling understanding of an issue on the basis of the available evidence.	*"One can judge an argument by how well thought-out the position are, what kind of reasoning and evidence are used to support it, and how consistent the way one argues on this topic is as compared with other topics."*

Source: Based on King and Kitchener (1994, 14–16: Exhibit 1.1).

Table B.26 Integrative levels of moral judgment (Lawrence Kohlberg).

Level	What is right?	Reasons for doing right	Social perspective
I. Preconventional			
1. Heteronomous morality	To avoid breaking rules backed by punishment, obedience for its own sake, and avoiding physical damage to persons and property.	Avoidance of punishment, and the superior power of authorities.	*Egocentric point of view* Doesn't consider the interests of others or recognize that they differ from the actor's; doesn't relate two points of view. Actions are considered physically rather than in terms of psychological interests of others. Confusion of authority's perspective with one's own.
2. Individualism, instrumental purpose, and exchange	Following rules when it is to someone's immediate interest: acting to meet one's own interests and needs and letting others do the same. Right is also what's fair, what's an equal exchange, a deal, an agreement.	To serve one's own needs or interests in a world where you have to recognize that other people have their interests, too.	*Concrete individualistic perspective* Aware that everybody has his own interest to pursue and these conflict, so that right is relative (in the concrete individualistic sense).
II. Conventional			
3. Mutual interpersonal expectations, relationships, and interpersonal conformity	Living up to what is expected by people close to you or what people generally expect of people in your role as son, brother, friend, etc. "Being good" is important and means having good motives, showing concern about others. It also means keeping mutual relationships, such as trust, loyalty, respect, and gratitude.	The need to be a good person in your own eyes and those of others. Your caring for others. Belief in the Golden Rule. Desire to maintain rules and authority which support stereotypical good behavior.	*Perspective of the individual in relationship with other individuals* Aware of shared feelings, agreements, and expectations which take primary over individual interests. Relates points of view through the concrete Golden Rule, putting yourself in the other persons' shoes. Does not yet consider generalized system perspective.

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Table B.26 Integrative levels of moral judgment (Lawrence Kohlberg).

Level	What is right?	Reasons for doing right	Social perspective
4. Social system and conscience	Fulfilling the actual duties to which you have agreed. Laws are to be upheld except in extreme cases where they conflict with other fixed social duties. Right is also contributing to society, the group, or institution.	To keep the institution going as a whole, to avoid the breakdown in the system "if everyone did it," or the imperative of conscience to meet one's defined obligations (easily confused with stage 3 belief in rules and authority).	*Differentiates societal point of view from interpersonal agreement or motives* Takes the point of view of the system that defines roles and rules. Considers individual relations in terms of place in the system.
III. Postconventional, or principled			
5. Social contract or utility and individual rights	Being aware that people hold a variety of values and opinions, that most values and rules are relative to your group. These relative rules should usually be upheld, however, in the interest of impartiality and because they are the social contract. Some nonrelative values and rights like *life* and *liberty*, however, must be upheld in any society and regardless of majority opinion.	A sense of obligations to law because of one's social contract to make and abide by laws for the welfare of all and for the protection of all people's rights. A feeling of contractual commitment, freely entered upon, to family, friendship, trust, and work obligations. Concern that laws and duties be based on rational calculation of overall utility, "the greatest good for the greatest number."	*Prior to society perspective* Perspective of a rational individual aware of values and rights prior to social attachments and contracts. Integrates perspectives by formal mechanisms of agreement, contract, objective impartiality, and due process. Considers moral and legal points of view: recognizes that they sometimes conflict and finds it difficult to integrate them.
6. Universal ethical principles	Following self-chosen ethical principles. Particular laws or social agreements are usually valid because they rest on such principles. When laws violate these principles, one acts in accordance with the principle. Principles are universal principles of justice: the equality of human rights and respect for the dignity of human beings as individual persons.	The belief as a rational person in the validity of universal moral principles, and a sense of personal commitment to them.	*Perspective of a moral point of view* from which social arrangements derive. Perspective is that of any rational individual recognizing the nature of morality or the fact that persons are ends in themselves and must be treated as such.

Source: Kohlberg (1976, 174–76: Table 2.1).

Table B.27 Integrative levels of cognition (Herb Koplowitz).

Level	Causation	Relation among variables	Boundaries	Permanent objects
1. Formal operations	*Linear* The formal-operational concept of causality is a linear one. An event is conceived of as being the result of a previous event. The previous event may itself be thought of as resulting from a previous or string of events. The linearity of the formal-operational concept of causality is also revealed in questions commonly asked about events. "Who started it?" "Whose fault is it?" "How did it begin?" These questions imply a causal chain that has a beginning and while they are typically not asked by persons in postformal stages of development, they are often asked by formal thinkers.	*Independent* Inhelder and Piaget describe the strategy of "separation of variables" and the schema "all other things being equal" as being important aspects of formal-operational thinking and problem-solving. A preformal thinker might compare the flexibility of a short, thick, wooden rod with that of a long, thin, iron rod. Formal operations are identified by systematic testing of various rods differing only in length in order to prove that a longer rod is more flexible than a shorter one, "all other things being equal." Implicit here is a view that length operates independently of all other variables.	*Closed* In formal operations, events, objects, and the systems to which they belong are thought of as having closed boundaries. The closed-boundary concept affects problem solving. In formal-operational thinking, attempts to understand what is contained within a boundary are made by examining only what is inside the boundary without regard for what is on the outside, that is, the context in which the event, object, or variable operates.	*Basic* A permanent object is a physical entity thought of as existing whether or not it is perceived or known. Throughout the development of formal operations, one believes that a permanent object, such as a chair, closely resembles one's knowledge of it and that the nature and existence of the object are independent of the knower. The permanent object is the major building block of the formal-opertional view of reality.

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Table B.27 Integrative levels of cognition (Herb Koplowitz).

Level	Causation	Relation among variables	Boundaries	Permanent objects
2. General system concepts	*Cyclical* The general systems concept of causality is cyclical. This cyclical view of causality is less concrete and more abstract than the linear formal-operational concept. The formal-operational view is contained within the general system view. Any causal cycle can be broken at any point to produce a linear causal pattern. Any aspect of a system's dynamics is part of a cyclical causal pattern, whether that pattern is a simple pair of mutually causative events (the simplest causal cycle) or a more complex causal network.	*Interdependent* The general system thinker conceives of variables as acting interdependently rather than independently as the formal-operational thinker does. This results in a different analysis of any situation in which variables interact. According to general system reasoning, we cannot describe the husband's contribution to the family situation, " all other things being equal," because the husband will make a different contribution depending on how other family members act. Operations in general system are made at the level of the system rather than at the level of the variable.	*Open* The boundaries drawn by general system thinkers are open. An open boundary around a system is one that allows a flow of energy and information between the system and its environment. A boundary is also said to be open if it does not clearly and completely separate what is on its inside from what is on its outside. A family may consist of a husband, a wife, and two children, but examinations of the family and interventions in it take into account the other relatives, the neighbors, the school, and the work environment that affect the family system.	*Basic, but meaning is constructed* The general system concept of the permenent object is very like the formal-operational one. The object exists as known independently of the knower and the permanent object is still the major building block of reality. However, [one] will be aware that the meanings that objects carry are constructed by the knower. Perry calls this recognition of different frames of reference and different value systems "relativism." He notes that a major aspect of cognitive development is an increase of the areas in which one is able to operate in a relativistic manner.

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Table B.27 Integrative levels of cognition (Herb Koplowitz).

Level	Causation	Relation among variables	Boundaries	Permanent objects
3. Unitary concepts	*Pervades space-time* The unitary concept of causality is radically different from less developed concepts of causality, and this is due to differences between the unitary concept and preunitary structures of two other concepts: time and space. In unitary thought, time and space are thought of as part of a four-dimensional space-time continuum rather than as existing independently as one temporal dimension and three spatial dimensions as in general systems and previous stages. The division of experience into spatial and temporal dimensions is thought of as an action taken by the knower (like the division of a map into east-west and north-south dimensions) rather than as an intrinsic aspect of reality. This is a fundamental aspect of relativity theory. Time and space are both seen as constructs, artifacts of the knower's attempt to make sense of his/her experience.	*Unity* According to the unitary view, there is an essential unity among variables. Space, for example, is not considered to exist separate from space-time, and it is only by being measured that a length comes to be two meters and hence comes to exist as a length. Thus, measurement is more a process of construction than one of observation. Variables do not exist separately in reality, but, rather, it is in the nature of reality that it allows us the opportunity to construct variables and to separate them from the unity in which they are enmeshed. The Heisenberg uncertainty principle, therefore, indicates that the physicist is not studying an external world when measuring properties of particles, but, rather, the physicist's interactions with the external world.	*Constructed* The unitary concept of boundaries is that they are constructed by the knower to help in making sense of experience. The universe is conceived of as an undifferentiated mass, and any division of it into one object separated from others, one event separated from others, or one variable separated from others is a division made, not discovered, by the knower. This is a natural extension of the unitary conception of variables as constructs.	*Constructed* The unitary concept of the permanent object, like the unitary concept of variables and boundaries, is that objects are constructed by the knower to make sense of perceptual data and that objects are not an aspect of reality waiting, as it were, to be noticed by an observer. This is a difficult notion for most adults to assimilate as they experience objects as existing in a world external to themselves. In unitary thought, unlike in preunitary thought, the permanent object is not the fundamental building block of reality.

Source: Excerpted from Koplowitz (1984, 273–91).

Table B.28 Integrative levels of social cognition (Deirdre A. Kramer).

Level	Characteristics
1. Undifferentiation	*No differentiation of perspectives or contexts*
2. Preformism	*Differentiation of physical, behavioral and demographic characteristics with no integration*
3. Formism/mechanism	*Integration into psychological traits or causes-effect sequences* To summarize briefly, this level is defined as the endorsement of a static, trait-oriented approach to understanding the world resulting in gross generalizations.
4. Static relativism	*Awareness of inconsistencies in traits and behaviors* Following the formistic/mechanistic level is what the author refers to as the static contextual level, which construes human behavior as essentially contradictory and random, with no attempt at integration or explanation of the contradiction. It is referred to as static because there is no explicit emphasis on the dynamic nature of behavior and institutions, or on the continually changing cultural and historical context. However, it presents a rejection of form, suggesting some relativistic features.
5. Static systems	*Integration of consistencies and inconsistencies into systems* The level following static relativism is one that the author refers to as static systems. At this level the adolescent constructs systems of self, other, and interpersonal relationships that subsume apparent contradictions into more integrated, coherent structures, providing a deeper insight into the apparent contradiction. While the concepts may feature holism, they are generally static—they do not stress the dynamic, changing, actively constructed nature of such systems.
6. Dynamic relativism	*Differentiation of systems into culturally and historically defined contexts* The dynamic relativism level of thought would be characterized by an awareness that social-cognitive systems are culturally and historically bound. However, at this level, there is no way to predict in what direction such systems will change, and there is no relationship among different systems or contexts, either cross-culturally or over time.

(continued)

Table B.28 Integrative levels of social cognition (Deirdre A. Kramer).

Level	Characteristics
7. Dynamic dialecticism	*Dialectical integration of cultural and historical systems into evolving social structures* At the dynamical dialectical level, perfect prediction is also impossible, because of the emergent quality of evolving structures. However, there is nevertheless a direction to such change, and a relationship among contrasting systems, especially historical ones, as they evolve out of, in opposition to, and are constrained by, previous systems.

Source: Excerpted from Kramer (1989, 153–55).

Table B.29 Integrative levels of self-representation (Gisela Labouvie-Vief et al.).

Level	Description	Example
0. Concrete-presystemic	The language used is simple and concrete. Characteristics and physical traits are seen as global. Events are detailed in simple seriation. Action-oriented behaviors describe activities. No references to goals or psychological processes occur.	An engineer. Physically-robust-strong 6 ft 280 lbs. I am nice. I'm tall. I am pretty. I have two sisters.
1. Interpersonal-protosystemic	Simple evaluations are made that reflect the values of the immediate social group. Traits described are nondifferentiated. Individuals are described in terms of relationships (simple descriptors) and social networks. Emphasis is on features of the self or others that make for ingroup acceptance.	I like to fool around and make my friends laugh. I am outgoing and friendly. I love my family. I am fun to be with. I have lots of friends. I am involved in many clubs at school.
2. Institutional-intrasystemic	Interpersonal descriptors indicate a clearer sense of the individual within the social group. Traits at this level indicate a more self-directed and goal-directed individual whose evaluations are guided by achievement-oriented and conventional goals, values, and roles. Achievement of these goals and values is a frequent theme.	I am family-oriented and active in my community. Effective as a mother. I am an empathic and committed friend. I have not been successful in my life. I work hard to support my children and really love them. Have tried with some success, to develop the patience of my father and devotion of my mother.

(continued)

Table B.29 Integrative levels of self-representation (Gisela Labouvie-Vief et al.).

Level	Description	Example
3. Contextual-intersystemic	Descriptions are critical of convention, involve an awareness of how traits change, and give a sense of individuals with their own value system. Institutional goals are reexamined and put into historical or psychological perspective. Descriptions involve references to processes and contrasts over time.	I am a singer, an actress, and a writer and want to use these talents more creatively than I do now. I get along well with all people, but need to develop more insight as to what motivates other people. Relearning who I am. I am adding new dimensions to my life in as many ways as possible.
4. Dynamic-intersubjective	Roles and traits are described at a complex psychological level and reflect awareness of underlying, often unconscious, motivation and reciprocal interaction. Activities and goals are seen as subject to continual revision as one gains knowledge of oneself and others. Reference is to multiple dimensions of life history and an emphasis on process, becoming, and emergence.	I struggle with the concept of who I am and have been identified (all giving mother, self sufficient, religious) and I think, feeling the need to be more individualized woman with specific needs and desires. I work for profit now rather than for satisfaction, partly because of my (guilty) need to continue to support my family. At this point in my life and my parents lives, they are becoming dependent and I find myself reliving the above tensions of struggling to remain my adult self but getting pulled back to my "younger" self as I have spent more time with them.

Source: Labouvie-Vief et al. (1995, 407: Table 1).

Table B.30 Integrative levels of knowing (Michael Lewis).

Level	Description
1.	*I know* This level prevails from birth until the beginning of the second year of life and is likely to be driven by basic processes common to other mammals. It is based on adaptive evolved complex action patterns and involves little or no language; it is not supported by the mental state of the idea of me or consciousness. For example, there is now evidence using eye gaze to indicate that young infants can anticipate an intention of another by selectively looking at one consequence over another. Many organisms share in this level of knowledge. For example, when an object in the visual field rapidly expands, infants, as well as adults and animals, show surprise and discomfort. This response is simply built into the core features of perceptual-motor knowledge or action patterns. Likewise, a rat running toward a wall perceptually knows it's a wall and does not run into it. In the past 30 years there has been an expanded test of infant competencies, which reflect such a knowledge level. Infants' competencies however, are not the same as understanding and the distinction between competence and understanding is necessary in order not to confuse this level of knowledge from the others.
2.	*I know I know* This level involves a reflected consciousness as measured by self-referential action. It is based on the mental state of me, and allows for the capacity to reflect on one's self and to reflect on what one knows. This mental state is a metarepresentation. It is similar to a memory of a memory. Whereas a child at the first level may have a memory, it is at the second level that metamemory is possible. Here the child remembers that she remembers. As we have shown, this capacity emerges somewhere in the middle of the second year of life.
3.	*I know you know* This form of knowing takes into account the mental state that not only do I know something, but I believe others know it as well; it is the ability and basis of shared meaning. This does not imply shared attention which belongs to Level 1, although with the emergence of Level 2 this action pattern can become a thought. This representation, that you know what I know, does not need to be accurate. Adults know more than children know; thus, the child may not really know what the adult knows. The child is likely to make errors, something called egocentric errors. That is, she assumes that what she knows is what the other knows. At this level, children know, they know they know, and they also know you know. What they cannot yet do is place themselves in opposition to what they know. This level, in combination with the earlier ones, accounts in part for the early ability to deceive. A 2 ½-year-old child who deceives knows that he knows and he knows that you know; thus, deception is possible. It is also the reason why children are likely to make the traditional false belief error.

(continued)

Table B.30 Integrative levels of knowing (Michael Lewis).

Level	Description
4.	*I know you know I know* It addresses the coactive and recursive nature of cognition. It is characterized as *I know you know I know* or recursive knowledge. At this level, not only are there two actors, as at Level 3, but each actor has a perspective. These perspectives can be different. It is when there are two perspectives that one has the ability to recognize false belief. Only when one has reached the level of knowing that "they know I know" can one's knowledge about what they know be corrected, because you can check their knowledge of what they know about you against what you know. That is, once a child knows that she can be the subject and also the object of the knowledge of another, she is capable of recognizing the difference in perspectives between individuals. It is at this final level of perspective-taking that mature meta-knowledge can emerge.

Source: Excerpted from Lewis (2015, 438–39).

Table B.31 Integrative levels of ego identity (Jane Loevinger and Lê Xuân Hy).

Level	Characteristics
1. [Presocial]	One of the newborn's earliest tasks is to construct for him or herself a stable world of objects. Constructing the world of objects and constructing the self are correlative. Many authors, especially many psychoanalytic theorists, refer to this period alone as ego development, but that leaves no distinctive term for the remaining stages that are the topic of our inquiry. This stage of ego formation is called the first stage and is acknowledged for theoretical completeness. It is beyond the scope of our work.
2. Impulsive	*Impulse control*: Impulsive. *Interpersonal mode*: Egocentric, dependent. *Conscious preoccupations*: Bodily feelings. The lowest stage that is accessible by our methods of study is the Impulsive stage. The child at this stage is a creature of physical needs and impulses, dependent on others for control. Deep and dependent attachment to caretakers is colored by physical needs. Other people are understood in terms of the simplest dichotomies, good and bad, clean and dirty. Good guys give to me, mean ones do not. The growing sense of self is affirmed by the word "No." There is little sense of causation. Punishment is arbitrary or retaliatory. Rules are poorly understood. Lacking the ability to conceptualize inner life, the child cannot distinguish physical from emotional malaise. This is normal behavior for the very young child; by school age, children optimally have advanced beyond it, but those who do not may be diagnosed as "impulsive personalities."
3. Self-protective	*Impulse control*: Opportunistic. *Interpersonal mode*: Manipulative, wary. *Conscious preoccupations*: "Trouble," control. The Self-protective stage, the first step toward control of impulses and hence of character development, occurs when the child becomes capable of delay for immediate advantage. Children at this stage appreciate rules and know it is to their advantage to play by them. They are creatures of more or less opportunistic hedonism; they lack long-term goals and ideals. They want immediate gratification and, if they can, will exploit others for their ends. Seeing interpersonal relationships as exploitative, they are themselves wary and self-protective. If they "get in trouble," it is because they were with the "wrong people." Thus, blame is understood but assigned to others, to circumstances, or sometimes to a part of themselves for which they do not feel responsible ("my eyes"). In small children passing through this stage in normal time, rituals and traditions tend to be prominent, a kind of embodiment of rules and controls. Older children and adults who remain at this stage see life as a zero-sum game; they may become hostile, opportunistic, or even psychopathic. However, most adults go beyond this stage, and probably most Self-protective persons find a place in normal society and may even be successful, given good luck, good looks, intellectual brilliance, or inherited wealth.

(continued)

Table B.31 Integrative levels of ego identity (Jane Loevinger and Lê Xuân Hy).

Level	Characteristics
4. Conformist	*Impulse control*: Respect for rules. *Interpersonal mode*: Cooperative, loyal. *Conscious preoccupations*: Appearances, behavior. In normal development, at school age or somewhere in the school years, the child negotiates the transition from the egocentric Self-protective stage to the group-centered Conformist stage. More psychologists and philosophers have described Conformity than any other stage. At this stage, the child identifies self with the group or its authority—be it parents, teachers, or peers. Rules are accepted just because they are the rules. This is the period of greatest cognitive simplicity: There is a right way and a wrong way, and it is the same for everyone all the time, or at least for broad classes of people described in demographic terms. What is conventional and socially approved is right. That is usually true with respect to conventional gender roles. However, a person who rigidly conforms to some unconventional gender norms is still a Conformist. Friendliness and social niceness are highly valued; disapproval is a potent sanction. The person is preoccupied with appearance, material things, reputation, and social acceptance and belonging. Inner states are perceived in the simplest language (sad, happy, glad, angry, love, and understanding), contrasting with an almost physical version of inner life at lower levels (sick, upset, mad, excited) and a richly differentiated inner life at higher levels. People, including the self, are perceived in terms of stereotypes based on social groups rather than in terms of individual differences. The way people are and the way they ought to be are not sharply differentiated. People at this stage usually describe themselves and others of their in-group in socially acceptable terms. Interpersonal interaction is seen primarily in terms of actions, not feelings, and the prototypic action is talking. Group pressure can presumably encourage transition from the Self-protective to the Conformist stage. But what impels the transition out of pure conformity? Possibly, the young person during the primary school and secondary school years finds him or herself a member of different groups that demand conformity to somewhat disparate standards. One woman, for example, said that her mother punished her for some infraction by forbidding her to go to mass. She feared punishment in the Hereafter, but her mother was the clear and present danger. An individual can hardly endure such a dilemma without abandoning his or her absolute faith in at least one of the competing authorities.
5. Self-aware	*Impulse control*: Exceptions allowable. *Interpersonal mode*: Helpful, self-aware. *Conscious preoccupations*: Feelings, problems, adjustment. By whatever means, the person at the Self-aware stage has become aware that not everyone, including his or her own self, conforms perfectly all the time to the characteristics that stereotypes seem to demand. Once “what I am” is untied from “what I ought to be,” the way is open to begin examination of self. The ability to conceptualize inner life expands; interpersonal relationships are described not merely as actions but also in terms of feelings. In many people at this stage, there is an acute sense of the distinction between self and group; emotions such as self-consciousness and loneliness are described. At the same time, the person perceives that there may be alternative possibilities in many situations that for the Conformist are covered by absolute rules or statements. Qualifications and contingencies are allowed, although they still tend to be stated in broadly demographic terms rather than in terms of individual differences: For example, some activity is okay if you are an adult, or if you are a boy, rather than if you are personally qualified or have a deep desire for it. Such modification of absolute rules may apply to anything from sexual mores to a woman having a career. The Self-aware stage is still basically a version of Conformity.

(continued)

Table B.31 Integrative levels of ego identity (Jane Loevinger and Lê Xuân Hy).

Level	Characteristics
6. Conscientious	*Impulse control*: Self-evaluated standards, self-critical. *Interpersonal mode*: Intense, responsible. *Conscious preoccupations*: Motives, traits, achievements. Growth to the Conscientious stage is another major and mysterious shift, for, as Freud pointed out, so long as sanctions for misdeeds come from outside oneself, they can be escaped, but a bad conscience is ineluctable punishment. How are people induced to make that shift? The psychoanalytic answer is by identification with others admired, loved, or even feared; the social learning answer is that in the long run a person without conscience is punished or socially disapproved. The social learning answer seems more adequate to account for growth to Conformity than to growth past that stage, and intuitively conscience seems to be less calculating than is implied by social learning theory. However, research has no clear answers. The distinctive mark of the Conscientious stage is self-evaluated standards: I approve or disapprove of a given conduct not just because my family or my schoolmates or the authorities do, but because that is what I personally feel. Of course, most people at this level do choose to adopt conformity as an everyday rule, so the difference between this stage and the Conformist and Self-aware stages is not the behavior itself. At this stage, one is guilty not primarily, or not only, when one has broken a rule, but rather when one has hurt another person. Motives and consequences are more important than rules per se; ought is differentiated from is. Inner states and individual differences are described in vivid and differentiated terms. Long-term goals and ideals are characteristic. The Conscientious person is reflective; self and others are described in terms of reflexive traits. The only reflexive traits that regularly appear at a lower level are self-consciousness and self-confidence. The Conscientious person is self-critical but not totally rejecting of self, as are some persons at the lowest levels (as well as depressed people of any level). The recognition of multiple possibilities in situations leads to a sense of choice; decisions are made for reasons. The person strives for goals, tries to live up to ideals, and to improve the self. The moral imperative remains, but it is not just a matter of doing right and avoiding wrong; priorities and appropriateness are considered. Moral issues are separated from conventional rules and from esthetic standards or preferences. To make such distinctions entails greater conceptual complexity than at the Conformist level or lower. Achievement is highly valued, not only in terms of competition or social approval (which always retain some importance), but in terms of one's own standards. Work, rather than being purely onerous, is an opportunity for achievement, so long as it is not dull or boring. People at this level are more likely than those at lower levels to think beyond their own personal concerns to those of society. The conscientious character has the negative aspect that the person may feel excessive responsibility for others.

(continued)

Table B.31 Integrative levels of ego identity (Jane Loevinger and Lê Xuân Hy).

Level	Characteristics
7. Individualistic	*Impulse control*: Tolerant. *Interpersonal mode*: Mutual. *Conscious preoccupations*: Individuality, development, roles. Where the Conscientious person has a vivid sense of individual differences, the person at the next stage (Individualistic) has a sense of individuality, of the personality as a whole or the style of life. There is a greater tolerance for individual differences than at earlier stages. The inner self and the outer self are often differentiated, a distinction anticipated at the Conscientious level in concern about deceptive behavior. Although a concern for the problems of dependence and independence is a recurrent one, at this stage the person distinguishes physical, financial, and emotional dependence; there is particular concern for emotional dependence. Relationships with other people, which have been becoming deeper and more intensive as the person grew from the Conformist to the Conscientious stage, are recognized as being partly antagonistic to the striving for achievement and the sometimes excessive moralism and responsibility for others at the Conscientious level. There are other new elements at the Individualistic level, more fully developed at the Autonomous stage. These ideas include psychological causation and psychological development. Below the Conscientious stage, almost no one ever mentions spontaneously the development of personality or of traits. Another new element is a concept of people as having and being different in different roles. The prime example of role differentiation—that a modern woman is expected to serve as wife, mother, housekeeper, lover, working woman, and so on—has become such a staple topic of women's magazines that it turns up at lower levels too. It illustrates the fact that not all clichés are Conformist.
8. Autonomous	*Impulse control*: Coping with conflict. *Interpersonal mode*: Interdependent. *Conscious preoccupations*: Self-fulfillment, psychological causation. Autonomy is a need that recurs throughout life in different forms. Erikson used the term autonomous for the stage here designated as Self-protective. The young child, even in the Impulsive stage, asserts him or herself by demanding to “do it by self.” Here the term autonomy is reserved for a stage at the other end of the scale. Its chief characteristic is the recognition of other people's need for autonomy. There is also some freeing of the person from the excessive striving and sense of responsibility characteristic of the Conscientious stage. Moral dichotomies are no longer typical. They are replaced by a feeling for the complexity and multifaceted character of real people and real situations. There is a deepened respect for other people and their need to find their own way and even make their own mistakes. Crucial instances are members of one's own family, particularly one's children. Conflicts between needs and desires are recognized and often acknowledged as part of the human condition, and thus they are not totally solvable. There is a high toleration for ambiguity and recognition of paradoxes. Humor is not hostile but tends instead to be existential, touching on the droll aspects of the nature of things. The Conscientious person's striving for achievement is transmuted into a search for self-fulfillment.

(continued)

Table B.31 Integrative levels of ego identity (Jane Loevinger and Lê Xuân Hy).

Level	Characteristics
9. Integrated	*Interpersonal mode*: Cherishing individuality. *Conscious preoccupations*: Identity. Only a few individuals, probably less than 1% of an urban population in the United States, for example, reach the theoretical highest point, the Integrated stage. Data at present do not suffice to describe fully this theoretical high point. Maslow probably provides what is the best description of the self-actualizing person. Because this stage is rare in most samples and there are major differences among qualified raters both as to the description of this level and application of the description in particular cases, under most circumstances it is best combined with the Autonomous stage.

Source: Excerpted from Hy and Loevinger (1996, 19–27).

Table B.32 Integrative levels of counting, story-telling, and drawing (Michael F. Mascolo and Kurt W. Fischer).

Level	Age	Number	Narrative	Drawings (art)
1. Single representations	18–24 months	*Counting actions* Begins to count objects, slowly developing one-to-one correspondence, sequencing, and idea that last number counted represents total items.	*Global description and shift of focus* Simple descriptions of individual events (e.g., "we went to the zoo") without links to other elements. Adults move narrative forward (shift focus) using questions.	*Scribbles and post-hoc labeling* Scribbling and primate figures; child labels figure after rather than before completion.
2. Representational mappings	3.5–4 years	*Mental counting line* Representation of relations between numbers; comparison of more vs. less.	*Causal-temporal action sequences* Child relates multiple actions/events in time or cause-effect relation (e.g., "We went to the zoo and then we got a hot doc").	*Identifiable objects and figures* Able to draw barely articulated figure or object (e.g., person), often hovering over bottom of page.
3. Representational systems	6–7 years	*Mental number line* Understanding relations between numbers on a "mental" number line; capacity for addition and subtraction. By 8–9 years, multiplication and division.	*Intentional story line* Temporal-causal plot lines involving characters with mental states and motives (e.g., "We went to the zoo, but then I got hungry so we took the train to go buy some yummy hot dogs").	*Mental reference line* Child can draw identifiable persons and objects placed within a particular location or scene (e.g., person and a house; flower under the sun), often with lines indicating ground or sky.
4. Single abstractions	10–11 years	*Simple algebraic representation* Incipient representation of single abstract variables representing quantity (e.g., 2x = 4).	*Conflict-driven multi-lined narrative* Complex stories involving characters with mental states, motives, organized plots, and subplots driven by conflicts and attempts to resolve conflicts.	*Three dimensional scene* Draws scenes with fore-, middle-, and background in continuous space; realistic details; use of visual metaphor (drawing a teacher as a "witch").

(continued)

Table B.32 Integrative levels of counting, story-telling, and drawing (Michael F. Mascolo and Kurt W. Fischer).

Level	Age	Number	Narrative	Drawings (art)
5. Abstract mappings	14–15 years	*Transformation of algebraic relationships* Capacity to coordinate the relation between two abstract variables (e.g., f = m *a; $a^2 + b^2 = c^2$).	*Dialectic relations among stable characters* Complex narratives involving characters with inner states and continuity over time. Conflicts derive from relations among characters or events.	*Visual-conceptual integration* Intentional use of variation in form, content, or technique in the service of conceptual goal (use of distortion, color variations to represent emotional themes); abstract themes.
6. Abstract systems	18–21 years	*Higher-order mathematical relations* Capacity to manipulate abstract relations involving change (e.g., calculus as an integration of algebra, geometry, and arithmetic); capacity to solve two simultaneous abstract relations; abstract algebraic proofs.	*Narratives structured by integrative relations* Complex interweaving narratives organized by relations among multiple qualities of characters and events; integrative use of higher-order literary devices (e.g., anachrony, embedded narrative, higher-order tropes).	*Higher-order visual-conceptual integrations* Manipulation of multiple visual, conventional, and/or methodological means to represent intangible, emotional, or abstract content. Modification of convention to express abstract, emotional, and other visual content.
7. Single principles	25+ years	*Manipulation of higher-order mathematical structures and objects* Relations among abstract structures of mathematical operations (e.g., detecting structural isomorphisms between groups of mathematical operations in disparate areas).	*Principled integration of literary forms and genres* Principled articulation and integration of relations among multiple literary genres, methods, styles, etc. into a stable and consolidated style or narrative system that organizes a given narrative.	*Principled consolidation of style* Visual expression organized in terms of systematic principles that organize multiple dimensions of visual, expressive, methodological, conventional forms, and content.

Source: Based on Mascolo and Fischer (2010, 162: Table 6.1).

Table B.33 Integrative levels of religious judgment (Fritz Oser and Paul Gmünder).

Level	Summary	Characteristics
0 .	*The perspective of the dichotomy between interior and exterior*	Children are incapable of distinguishing different forces outside of themselves. They only know that they are being influenced from the outside. They can differentiate between doing something themselves and being influenced by or being dependent upon others. (When parents speak of God, God can, on one occasion, be something indeterminable and, on another occasion, an uncle or an unknown guest. From a cognitive point of view, this is a *prereligious* attitude.
1.	*The perspective of* Deus ex Machina The Ultimate interferes actively and unmediated in the world. Persons merely react. Pressure of expectation. Artificialism. Punctiliousness.	Children assume that everything is guided, led, and steered by external forces. Yet, for the first time, they clearly separate the forces of the Ultimate from the influences of adults and educators. The Ultimate is active, humans are reactive. This reactive posture is perceived as a pressure of expectation. The great advance from stage 0 to stage 1 consists in the children transferring those patterned behaviors, which they have learned from parents and educators, onto the still undetermined Ultimate and its effects.
2.	*The perspective of "Do Ut Des"* The Ultimate is still viewed as external and omnipotent, capable of punishing or rewarding. However, now the Ultimate can be influenced. Humans can undertake preventive actions. Limited autonomy. First form of rationalization.	The advance over stage 1 consists mainly in the fact that persons can now objectify consequences and thereby are able to coordinate them with the power of an Ultimate Being outside of them. Now there are means available for influencing the transcendent Absolute (Fate, spirits, God). This influence can be of various sorts: It can reduce punishment, it can achieve favors, or have a preventively calming character. (Seafarers during the Graeco-Roman period made sacrifices to the gods in order to obtain favorable winds.) Religious or animistic actions motivated by fear serve primarily for obtaining favors (wealth, health, a long life). Obviously, incidents of bad luck are viewed as actions by the Ultimate in direct correspondence with the quality of sacrifices, renunciations, and prayers, etc.

(continued)

Table B.33 Integrative levels of religious judgment (Fritz Oser and Paul Gmünder).

Level	Summary	Characteristics
3.	*The perspective of absolute autonomy and deism* The Ultimate is being pushed out of the world, transcendence and immanence are separated. Persons are solipsistically autonomous, responsible for the world and their own lives. Frequent rejection of religious and ecclesial authority: "Here I stand, I can do no other!" Formulation of ego-identity, distancing from parental and educational forces.	Persons at stage 3 are able to separate completely the domain of the Ultimate from their own. They attribute to themselves a great deal of responsibility for planning and decision-making activities. Yet, they fully separate out the Ultimate (Fate, Absolute Being, Spirit, God) and relegate it to an independent sphere of influence. This results in something akin to a "two kingdom theory." Now it is possible either to postulate consciously an atheistic worldview or to profess an extreme religious conviction. To the degree that the self of the person at stage 3 becomes "interpersonal" it becomes possible to distinguish between the domains of one's own competence and domains attributed to a Higher Entity (this is evident in a strong awareness of the distinction between God and humans, the sacred vs. the profane). At this stage, the person is a decision-making, responsible, determined self, just as the Ultimate is its own domain of decision-making solipsistic ego-structure. Influencing the Ultimate is no longer important, because it has its own sphere of responsibility.
4.	*The perspective of religious autonomy and the plan of salvation* The Ultimate is mediated again via immanence, either as constitutive grounds of possibility or as a cypher for the "self". Manifold forms of nature-worship, contemplation, social activism to make God real. However, subjects reject the claim of being able to accomplish all things on their own, they surrender again to an Ultimate. "Images of God" exist, if at all, as symbols only, otherwise as universal principles.	The essence of judgment at stage 4 consists in a new possibility of mediating between the decision-making autonomy of the subject and of an assumed Ultimate. Although imagined as transcendent, the Ultimate becomes immanent in the sense that it is identified as the condition for all decision-making and actions. The world is no longer determined by the Ultimate, in the sense of stage 1. Rather the earthly is seen as the "likeness" of the Divine, in the sense that it becomes the guarantor for the possibility of human accomplishments. One possible expression of this concept is to say that the Ultimate appears symbolically in nature, culture, and human capacities for love. (Or, put in the language of the philosophy of religion: God does not actively intervene in history: rather, as the ground of the world and of human existence God constitutes the condition for human action.) Persons begin to assemble a new semiotics for perceiving the preconditions which make possible human communication. (Wonderment about new-born life, for example, is always also an inquiring wonderment about the possibility of life in general.) The advance over stage 3 consists in the fact that persons now *have* a decision-making self which they can bring into a correlationally mediated relation with the Ultimate.

(continued)

Table B.33 Integrative levels of religious judgment (Fritz Oser and Paul Gmünder).

Level	Summary	Characteristics
5.	*The perspective of religious autonomy by means of intersubjectivity* Complete mediation of Being and world. Universality. Unconditional religiosity. Subject occupies a totally religious standpoint, feel no need to be grounded in a plan of salvation or a religious community, etc. Rather subjects experience unconditional and proleptic acceptance. Various forms: unconditional intersubjectivity, *unio mystica*, *boddhi*, divine illumination, etc.	At this stage, the relation between the self and the Ultimate is perceived as being mediated intersubjectively. Like stage 4, the question "why does something exist?" leads to the assumption that an Ultimate constitutes the possibility for human action. But now it is no longer possible to tie the ground of life and of the world to a predetermined plan without coupling this plan with human freedom and self-determination. The relation between the Ultimate and the human being is no longer directed by some sort of positive law (plan of salvation, the will of God), but the locus of the Ultimate is transferred of salvation or damnation is now tied back to an intersubjective basis, i.e., it is interpreted as loyalty or disloyalty to that Ultimate dimension in interactive actions. In the context of real, practical, and transcendental freedom, this sort of cognitive model defines the human essence of the person strictly as freedom. The Ultimate is viewed as absolute freedom which makes possible and meaningfully warrants finite freedom.
6.	*Remarks about stage 6* We attempted initially to construct such a highest stage deductively from theological and philosophical models. However, the subsequent empirical studies yielded no data that corresponded to this highest schema of consciousness. However, after we had fashioned and reformulated a possible stage 6 based on the immanent developmental logic underlying the first five stages. Until this stage can be verified empirically, its character is suggestive and theoretical.	Globally speaking one could say the stage 6 orientation tends toward universal communication and solidarity. What was valid for stage 5 must be decisively qualified. At the center of the reasoning structure of stage 6 rests a communicative praxis with claim to universal validity, intending universal solidarity (communicative praxis with the Ultimate, mediated through interindividual actions). Again, one's own autonomous freedom is viewed as constituted intersubjectively, though always from the perspective of universal communication and solidarity and, makes possible this freedom. At stage 5 there exists the possibility of interpreting the unconditional freedom of others legalistically; this, however, finally results in an aporia. The highest possible mediation is achieved only when one can presuppose a promise which makes it possible to let guilt, injustice, death, suffering, etc., take their course while totally trusting in the acceptance by the Ultimate—also, and particularly, in failure and pain.

Source: Oser and Gmünder (1991, 68–81).

Table B.34 Integrative levels of aesthetic experience (Michael J. Parsons).

Level	Characteristics	Psychological aspects	Aesthetical aspects
Preconventional			
1. Favoritism	The primary characteristics of stage one are an intuitive delight in most paintings, a strong attraction to color, and a freewheeling associative response to subject matter. Young children rarely find fault with paintings, no matter what their subject or style. They relish color, the more the better. They are often aware of the subject of a painting, i.e., what it represents; but they allow associations and memories freely to enter their response. The common characteristic is the happy acceptance of whatever comes to mind, not distinguishing between what is and is not relevant.	Psychologically, this is the stage where there is little awareness of the point of view of others. All that is occurs in experience; there is nothing else, and nothing to compare it with.	Aesthetically, paintings are a stimulus to pleasant experience. It does not matter what they represent or whether they are nonrepresentational. Liking a painting is identical with judging it, and it is hard to imagine a bad one. There are no distinctions of relevance nor questions about objectivity.
2. Beauty and realism	The dominant idea of stage two is that of the subject. Stage two is organized around the idea of representation. The basic purpose of painting is to represent something. It is true that some paintings are nonrepresentational, but they are not really meaningful. A painting is better if subject is attractive and if the representation is realistic. Emotion is something to be represented, as in smile or a gesture; and style is appreciated only as realism. Skill, patience, care are admirable. Beauty, realism, and skill are objective grounds for judgments.	Psychologically, is an advance because it implicitly acknowledges the viewpoint of other people. The notion of representation requires the distinction between what anyone can see and what one is merely reminded of. To stick to what is pictured is to understand that what one associates with the painting is not necessarily what others see.	Aesthetically, stage two is an advance because it enables the viewer to distinguish some aspects of experience as aesthetically relevant (those having to do with what is pictured) from some that are not (those not having to do with what is pictured). For example, the Renoir may be judged good because it pictures a dog, and dogs are nice. But this latter has become a fact about the dog, and not about the viewer's tastes, as with stage one. Similarly, the color of the Klee is good; and this is a fact about the color, not about personal favorites.

(continued)

Table B.34 Integrative levels of aesthetic experience (Michael J. Parsons).

Level	Characteristics	Psychological aspects	Aesthetical aspects
Conventional			
3. Expressiveness	The organizing insight of stage three has to do with expressiveness. We look at paintings for the quality of the experience they can produce, and the more intense and interesting the experience the better the painting. Intensity and interest guarantee that experience is genuine, i.e., really felt. The feeling or thought expressed may be the artist's or the viewer's, or both. It is always what is inwardly grasped by an individual person. This insight affects most of one's ideas of art. The purpose of art is to express someone's experience. The beauty of subject matter becomes secondary to what is expressed, and may actually get in the way of expression. Similarly realism of style and skill are not ends in themselves but means to expressing something, and may not be better than their contraries. There is skepticism about the value of talking about painting, and about the possibility of objective judgments, because the important criterion remains the quality of some individually felt experience.	Psychologically, stage three is an advance because it rests on a new awareness of the interiority of the experience of others, and a new ability to grasp their particular thoughts and feelings. There is also a corresponding awareness of one's own experience as something inward and unique.	Aesthetically, stage three is an advance because it enables one to see the irrelevance of the beauty of the subject, the realism of the style, and the skill of the artist. It opens one to a wider range of works and a better grasp of expressive qualities. An example is the difference between finding the Albright [his painting *Into the World Came a Soul Called Ida*, M.K.] ugly and distasteful, and finding it powerfully expressive of empathy with Ida.

(continued)

Table B.34 Integrative levels of aesthetic experience (Michael J. Parsons).

Level	Characteristics	Psychological aspects	Aesthetical aspects
4. Style and form	The new insight here is that the significance of a painting is a social rather than an individual achievement. It exists within a tradition, which is composed by a number of people looking over time at a number of works and talking about them. As they talk, they find some things more meaningful and others less so. They help each other to see perceptively. The work exists in public space; aspects of its medium, form, and style can be pointed to in an intersubjective way; in this way interpretation can be corrected and improved. There are relationships between different works—styles—and a history to their interpretation. All these aspects of a work are public and may have a bearing on its meaning. Its meaning is constituted by what can be discursively said by the group about it, and this is more than what is grasped inwardly by an individual at one time. The insight affects ideas about paintings. It places the emphasis on the way the medium itself is handled, on texture, color, form, space, because these are what are publicly there to see; and on style and stylistic relations, because these are how a work relates to the tradition. What is expressed in art is reinterpreted in terms of form and style, and is a public idea rather than a private state of mind.	Psychologically, the advance here is in the ability to take the perspective of the tradition as a whole. This is cognitively more complex than grasping the state of mind of one individual. An example is when one reads several interpretations of a work, and sees how each makes sense in its own terms and yet is part of the same tradition.	Aesthetically, this is an advance because it finds significance in the medium, form, and style, and distinguishes between the literary appeal of the subject and sentiment and what is achieved in the work itself. It finds significance in the stylistic and historical relationships of paintings, and it expands the kinds of meaning that can be expressed. It enables one to find art criticism useful as a guide to perception and to see aesthetic judgment as reasonable and capable of objectivity.

(continued)

Table B.34 Integrative levels of aesthetic experience (Michael J. Parsons).

Level	Characteristics	Psychological aspects	Aesthetical aspects
Postconventional			
5. Autonomy	The central insight here is that the individual must judge the concepts and values with which the tradition constructs the meanings of works of art. These values change with history, and must be continually readjusted to fit contemporary circumstances. Judgment is felt as both more personal and more fundamentally social. On the one hand the responsibility for judgment lies inevitable with the self. One's own experience is in the end the only possible testing ground for judgment, and one can affirm or amend accepted views only in light of one's best understanding of one' own response. The result is an alert awareness of the character of one's own experience, a questioning of the influences upon it, a wondering whether one really sees what one thinks one sees. In the same way the values that underlie our judgments are our own responsibility. Though they come from the tradition, they can be affirmed or amended only in light of our own sense of their value. If they fit us, we affirm them; if they do not, we must amend them. On the other hand, while one is individually responsible, the responsibility is toward others. The reexamination of accepted views is an attempt to fashion a more appropriate judgment in light of the common situation, and it is meant as valid for anyone in that situation. It is important therefore to talk with others about works of art and the common situation. One cannot question one's own experience without dialog, without considering the response of the others to the same works. Dialog provides the only leverage one has to question the tendencies of one's own experience and to understand their significance. In sum, while judgment is accepted as an individual responsibility, there is also a clear sense of the need for discussion and intersubjective understanding, and of responsibility to the community of truth.	Psychologically, this is an advance because it requires one to transcend the point of view of the culture. It requires the ability to raise questions about established views and to understand the self as capable of answering them. This implies a perspective on the culture itself.	Aesthetically, it is an advance because it enables one to make subtler responses, and to be aware that traditional expectations may be misleading. One also understands the practice of art, both its creation and appreciation, more adequately as the constant reexamination and adjustment of self in a common situation, as the exploration of values in changing historical circumstances.

Source: Excerpted from Parsons (1987, 22–26, 121–22).

Table B.35 Integrative levels of intelligence and ethics (William G. Perry).

Level	Characteristics
Dualism	
1.	*Basic Duality* Assumption of dualistic structure of world taken for granted, unexamined. Right vs. wrong, we vs. others, good vs. bad, what they want vs. what they don't want. All problems soluble by adherence: obedience, conformity to the right and what they want. Will power and work should bring congruence of action and reward. Multiplicity not perceived. Self defined primarily by membership in the right and traditional.
2.	*Multiplicity pre-legitimate* Multiplicity perceived, but only as alien or unreal. As alien it assimilates easily to error and otherness: "Others are wrong and confused (multiplicity)." Assimilated to authority, it leads to opposition: "I am right; they (authority) are needlessly confused (multiplicity). As unreal, multiplicity is a mere appearance, e.g.: "They want us to work on these things (multiplicity) to learn how to find *the* answer." Here opposition sees authority not as wrong but simply as failing in its mediational role. In either case multiplicity is perceived but not as a signal of legitimate, epistemological uncertainty.
3.	*Multiplicity subordinate* Multiplicity perceived with some of its implications. Authority may not have the answers yet in view. But trust in authority, at least in the ideal, is not threatened. Exercises in multiplicity may be enjoyed (authority) or disliked (adherence); authority is presumed to evaluate them on skill of presentation (not on structural properties). Adherence may fear they are judged on glibness, influence, or pull. Opposition here: "They judge all wrong." Self defined over against authority and in similar structural terms.

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Table B.35 Integrative levels of intelligence and ethics (William G. Perry).

Level	Characteristics
Relativism	
4.	*Multiplicity correlate or relativism subordinate* Dualism restructured in complex terms; right-wrong vs. multiplicity. Absolutes may be doubted in multiplicity area or considered so inaccessible as to be impossible to bring to bear on human affairs in any reasonably foreseeable future. In multiplicity, therefore, "anyone has a right to his own opinions." Multiplicity is acknowledged as relevant to self, by being confusing, liberating, intriguing, etc. or: Relativism perceived in multiplicity and assimilated to authority. That is: Authority can make judgments in multiplicity on discernible relations of propositions to each other (coherence) or to data (congruence). However, this is still "how they want us to think," rather than a consequence of the nature of all knowledge.
5.	*Relativism correlate, competing, or diffuse* Relativism perceived as way of perceiving, analyzing and evaluating, not because "they want us to think this way," but intrinsically. Authority perceived as authority in relativism. In relativism correlate, world divided into those areas where authority has the answers (e.g., physics or morals) and those in which relativism must be used (e.g., English paper). In relativism competing, relativism perceived as applying to whole world (with binary answers a sub-class), but this world alternates with a previous one. In relativism diffuse, the most fully developed of these structures, relativism is accepted generally but without implications for commitment.
6.	*Commitment foreseen* Relativism accepted for all secular purposes including binary judgment and action. Commitment may be perceived as a logical necessity for action in a relativism world and/or "felt" as needed (with or without explicit statement of a logical necessity). The realization may bring various reactions: eagerness, ambivalence, dismay, sturdiness, turmoil, simple acceptance.

(continued)

Table B.35 Integrative levels of intelligence and ethics (William G. Perry).

Level	Characteristics
Commitment in relativism	
7.	*Initial commitment* First commitment(s) or affirmation(s). Acceptance of their origins in self's experience and choices, some intimations of implications. Note on religion: In commitment involving a religious faith in an absolute, the same distinctions re commitment apply (cf. theological distinction between belief and faith). The structural solutions for relating an absolute and relativism are varied and not outlined here. In all of them the crucial criterion for the integrity of the relativism orientation is the attitude toward people with other absolutes.
8.	*Orientation in implications of commitment* Some implications of commitment realized: tensions between feelings of tentativeness and finality, expansion and narrowing, freedom and constraint, action and reflection. Prospect of (or even experience of) membership with authority in areas of commitment (values, address to others, occupation, etc.). Identity sensed in both content of commitment and in personal style of address to commitment.
9.	*Developing commitment(s)* Commitments expended or remade in new terms as growth. Balances are developing in the tensions of qualitative polarities of style, especially alternation of reflection and action. Acceptance of changes of mood and outlook within continuity of identity. Sense of being "in" one's life.

Source: Perry (1968, 257: folded Chart).

Table B.36 Integrative levels of logico-mathematical reasoning (Jean Piaget).

Level	Key features	Characteristics
1. Sensorimotor (0–2 years)	Sensori-motor schemata (assimilate schemata of perception, habit) Object permanence Empirical groupings (bodily movements)	Sensori-motor intelligence introduces reversals and detours; it has access to objects outside the perceptual field and habitual routes and so it goes beyond original distances in space and time but is still limited to the field of the subjects's own action.
2a. Preoperational: Symbolic, preconceptual (2–4 years)	Imaginal schemata (assimilate sensori-motor schemata) Symbolic function (e.g., language) Preconcepts (unable to distinguish "all" and "some") Participations (between distinct and distant objects) Transduction (reasoning by direct analogies)	With the beginning of representative thought and especially with the growth of intuitive thought, intelligence becomes capable of evoking absent objects, and consequently of being applied to invisible realities in the past and partly even in the future. But it still proceeds by way of more or less static figures—half individual, half-generic images in the case of the pre-concept, complex representative configurations, which are still better articulated, in the intuitive period—but they are nevertheless figures, i.e. "stills" of moving reality, which represent only some states of pathways out of the mass of possible routes.
2b. Preoperational: Intuitive (4–7 years)	Intuitive schemata (co-ordination and differentiation of imaginal schemata) Practical groupings (no genuine classes or relations)	Intuitive thought thus provides a map of reality (which sensori-motor intelligence, bound up with immediate reality, could not do), but is still imaginal, with many blank spaces and without sufficient co-ordinations to pass from one point to another.
3. Concrete operations (7–11 years)	Concrete schemata (grouping of intuitive schemata) Conservation (e.g., weight) Classification, qualitative seriation, system of numbers Logical groupings (e.g., transitivity, reversibility)	When groupings of concrete operations appear, these forms are dissolved or blended into the all-embracing plan and decisive progress is made towards the overcoming of distances and the differentiation of routes; thought no longer masters only fixed states or pathways but even deals with changes, so that one can always pass from one point to another and vice versa. Thus, the whole of reality becomes accessible. But it is still only a represented reality.
4. Formal operations (11+ years)	Formal schemata (second-degree operations) Formal logic (hypothetico-deductive) Grouping operating on concrete groupings	With formal operations there is even more than reality involved, since the world of the possible becomes available for constructions and since thought becomes free from the real world. Mathematical creativity is an illustration of this new power.

Source: Excerpted from Piaget (1999, 126–27, 146–52).

Table B.37 Integrative levels of classification (Jean Piaget and Bärbel Inhelder).

Level	Characteristics
1. Graphic collection *Sensori-motor/ preoperational*	*Pre-classificatory or para-classificatory (sub-logical)* Graphic collection as complex object or figure (pattern or representative image) Relation of component item and collection spatial or partitive Unable to differentiate between relations of similarity and those of belonging Intension not exhausted by relations of similarity and difference, as in the case of logical classes Intension includes relations of affinity or of belonging Lack of differentiation between extension and intension Extension sometimes determined by intension ('the same' elements) Intension sometimes determined by extension (collection depends on its shape as a whole) No implication of a hierarchical structure of class-inclusion
2. Non-graphic collection *Preoperational*	*Quasi-classificatory (pre-logical)* Collections are non-graphic Partitive membership (element x is only spatial part or 'piece' of continuous whole) Schematic membership (based on previous perceptual experiences) Increasing differentiation of intension and extension Objects assigned to collection on the basis of similarity Extension based on spatial or temporal proximity Lack of co-ordination of intension and extension Incorrect use of quantifiers 'all' and 'some' Lack of understanding of a singular class or empty class Distinction between subdivision of collection and class-inclusion in the strict sense Sub-collections united in the form $A + A' = B$, but there is no inverse operation $A = B - A'$ Incapable of grasping that 'all' the A are 'some' of the B No implication of a hierarchical structure of class-inclusion

(continued)

Table B.37 Integrative levels of classification (Jean Piaget and Bärbel Inhelder).

Level	Characteristics
3. Hierarchical classification	*Complete classificatory (logical)*
Concrete operations	Concrete reasoning applying to objects (elementary 'groupings' of classes and relations) Class membership Class defined by genus and specific difference Co-ordination of intention and extension Correct use of quantifiers 'all', 'some', 'a', and 'none' Characteristics of classification based on logical operations: (1) There are no isolated elements, i.e. elements not belonging to a class. This amounts to saying that all the elements must be classified and that, if an element (x) is the only one of its kind, it must give rise to its own specific (but singular) class: $(x)\ \varepsilon\ (A_x)$. (2) There are no isolated classes, i.e. every specific class A characterized by the property *a* implies its complement A' (characterized by $not - a$) within the closest genus B $(A + A' = B)$. (3) A class A includes all the individuals having the property a. (4) A class A includes only individuals having the property a. (5) All classes of the same rank are disjoint: $A\ x\ A' = 0$ or $An\ x\ Am = 0$. (6) A complementary class A' has its own characteristics a_x (thus $A' = A_x$), which are not possessed by its complement A: the individuals having the property a are thus $not - A_x$, just as individuals having the property a_x are $not - a$. (7) A class A (or A') is included in every higher ranking class which contains all its elements, starting with the closest, B: $A = B - A'$ (or $A' = B - A$) and $A\ x\ B = A$, which amounts to saying that 'all' A are 'some' B. (8) Extensional simplicity: the inclusions in (7) are reduced to the *minimum* compatible with the intensional properties. (9) Intensional simplicity: similar criteria (e.g. colours) distinguish classes of the same *rank.* (10) Symmetrical subdivision: if a class B_1 is subdivided into A_1 and A'_1 and the same criterion is applicable to B_2, then B_2 must likewise be subdivided into A_2 and A'_2. Incomplete logic of classes and logic of propositions Incomplete INRC group [i.e., logical transformations of identity, negation, reciprocity, and correlation, M.K.] No understanding of empty class

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Table B.37 Integrative levels of classification (Jean Piaget and Bärbel Inhelder).

Level	Characteristics
Formal operations	Formal reasoning applying to verbal statements (propositions) Complete logic of classes and logic of propositions INRC group [i.e., logical transformations of identity, negation, reciprocity, and correlation, M.K.] Empty class ($A = 0$) Negative class ($not - A$) Law of duality as synthesis of inversion or negation and reciprocity (if $A < B$ then $not - A > not\ B$)

Source: Excerpted from Inhelder and Piaget (1964, 17–150).

Table B.38 Integrative levels of social perspective-taking (Robert L. Selman).

Level	Concepts of persons	Concepts of relations
0.	*Undifferentiated* At this level, young children do not clearly differentiate physical and psychological characteristics of persons. Feelings and thoughts can be observed and recognized, but the confusion between the subjective-psychological and the objective-physical leads to confusion between acts and feelings or between intentional and unintentional behavior.	*Egocentric* Selves and others are clearly differentiated only as physical entities, not psychological entities. Thus subjective perspectives are undifferentiated and that another may interpret the same situation differently is not recognized. Concepts of relations of perspectives are limited by inability to differentiate clearly and by concomitant reduction of differences in perspectives to merely differences in *perceptual* perspectives.
1.	*Differentiated* At Level 1, the key conceptual advance is the clear differentiation of physical and psychological characteristics of persons. As a result, intentional and unintentional acts are differentiated and new awareness is generated that each person has a unique subjective covert psychological life. Thought, opinion, or feeling states within an individual, however, are seen as unitary, not mixed.	*Subjective* The subjective perspectives of self and other are clearly differentiated and recognized as potentially different. However, another's subjective state is still thought to be legible by simple physical observation. Relating of perspectives is conceived of in one-way, unilateral terms, in terms of the perspective of and impact on one actor. For example, in this simple one-way conception of relating of perspectives and interpersonal causality, a gift makes someone happy. Where there *is* any understanding of two-way reciprocity, it is limited to the physical–the hit child hits back. Individuals are seen to respond to action with like action.

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Table B.38 Integrative levels of social perspective-taking (Robert L. Selman).

Level	Concepts of persons	Concepts of relations
2.	*Self-reflective / second-person* Key conceptual advances at Level 2 are the growing child's ability to step mentally outside himself or herself and take a self-reflective or second-person perspective on his or her own thoughts and actions *and* on the realization that others can do so as well. Persons' thought or feeling states are seen as potentially multiple, for example, curious, frightened, and happy, but still as grouping of mutually isolated and sequential or weighted aspects, for example, mostly curious and happy and a little scared. Both selves and others are thereby understood to be capable of doing things (overt actions) they may not want (intend) to do. And persons are understood to have a dual, layered social orientation: visible appearance, possibly put on for show, and the *truer* hidden reality.	*Reciprocal* Differences among perspectives are seen relativistically because of the Level 2 child's recognition of the uniqueness of each person's ordered set of values and purposes. A new two-way reciprocity is the hallmark of Level 2 concepts of relations. It is a reciprocity of thoughts and feelings, not merely actions. The child puts himself of herself in another's shoes and realizes the other will do the same. In strictly mechanical-logical terms, the child now sees the infinite regress possibility of perspective taking (I know that she knows that I know that she knows ... etc.). The child also recognizes that the outer appearance—inner reality distinction means selves can deceive others as to their inner states, which places accuracy limits on taking another's inner perspective. In essence, the two-way reciprocity of this level has the practical result of detente, wherein both parties are satisfied, but not the relationship system between them.
3.	*Third-person* Persons are seen by the young adolescent thinking at Level 3 as systems of attitudes and values fairly consistent over the long haul, as opposed to randomly changeable assortments of states as at Level 2. The critical conceptual advance is toward ability to take a true third-person perspective, to step outside not only one's own immediate perspective, but outside the self as a system, a totality. There are generated notions of what we might call an "observing ego," such that adolescents do (and perceive other persons to) simultaneously see themselves as both actors and objects, simultaneously acting and reflecting upon the effects of action on themselves, reflecting upon the self in interaction with the self.	*Mutual* The third-person perspective permits more than the taking of another's perspective on the self; the truly third-person perspective on relations which is characteristic of Level 3 *simultaneously* includes and coordinates the perspectives of self and other(s), and thus the system or situation and all parties are seen from the third-person or generalized other perspective. Whereas at Level 2, the logic of infinite regress, chaining back and forth, was indeed apparent, its implications were not. At Level 3, the limitations and ultimate futility of attempts to understand interactions on the basis of the infinite regress model become apparent and the third-person perspective of this level allows the adolescent to abstractly step outside an interpersonal interaction and simultaneously and mutually coordinate and consider the perspective (and their interactions) of self and other(s). Subjects thinking at this level see the need to coordinate reciprocal perspectives, and believe social satisfaction, understanding, or resolution must be mutual and coordinated to be genuine and effective. Relations are viewed more as ongoing systems in which thoughts and experiences are mutually shared.

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Table B.38 Integrative levels of social perspective-taking (Robert L. Selman).

Level	Concepts of persons	Concepts of relations
4.	*In-depth* Two new notions are characteristic of Level 4 conceptions of persons. First, actions, thoughts, motives, or feelings are understood to be psychologically determined, but *not necessarily* self-reflectively understood. In this view, there are more complicated interactions *within* a person that cannot always be comprehended by the "observing ego" of Level 3. Thus, we see, whether or not it is so named, the generation of a notion of the unconscious in individuals. Persons are thereby seen to be capable of doing things not that they "don't want" to do, as at Level 2, but that they don't understand why they don't. Second, there emerges at Level 4 a new notion of personality as a product of traits, beliefs, values, and attitudes, a system with its own developmental history.	*Societal-symbolic* The individual now conceptualizes subjective perspectives of persons toward each other (mutuality) as existing not only on the plane of common expectations or awareness, but also simultaneously at multidimensional or deeper levels of communication. For example, in a dyad, perspectives can be shared at the level of superficial information, of common interests, or of deeper unverbalized feelings and communication. At this level, the adolescent or young adult can abstract multiple mutual (generalized other) perspectives to a societal, conventional, legal, or moral perspective in which all individuals can share. Each self is believed to consider this shared point of view of the generalized other or social system in order to facilitate accurate communication and understanding.

Source: Excerpted from Selman (1980, 37–40).

Table B.39 Integrative levels of social perspective-taking and interpersonal action (Robert L. Selman).

Level	Age	Social perspective-taking		Interpersonal action	
		Characteristics	Perspective	Shared experience (relatedness aspect)	Negotiation strategy (autonomy aspect)
0. Physicalistic	3–5 years	To understand my own perspective (egocentric)	First-person	Unreflected imitation or enmeshment; lack of differentiation	Physical force: impulsive fight or flight or freeze
1. Subjective	6–7 years	To understand your perspective, distinct from mine		Unreflected sharing of expressive enthusiasm	One-way, unilateral power: orders or obedience
2. Reciprocal	8–11 years	To understand your view of my (subjective) perspective	Second-person	Reflective sharing of similar perceptions and experiences	Cooperative exchange reciprocity: persuasion or deference
3. Mutual	12–14 years	To understand her or his view of us (our perspective)	Third-person	Empathic sharing of beliefs and values	Mutual compromise
4. Generalized other	15–18 years	To understand my own perspective in the context of multiple perspectives		Interdependent sharing of vulnerabilities and self-identities	Collaborative integration of relationship dynamics (commitment)

Source: Based on Selman (2003, 21, 31: Tables 2.1, 3.1).

Table B.40 Integrative levels of tasks in physics (Kristian Stålne, Michael L. Commons, and Eva Yujia Li).

Level	Characteristics
0. Calculatory 1. Automatic 2. Sensory & motor 3. Circular sensory-motor 4. Sensory-motor 5. Nominal 6. Sentential 7. Preoperational 8. Primary	
	In the following it will be demonstrated how the wave equation is derived by coordinating more and more complex building blocks
9. Concrete	At the concrete order a particle's or fluid element's state can be given in terms of actual numbers that represent Displacement $u_1, u_2, u_3, \ldots$ Particle velocity $v_1, v_2, v_3, \ldots$ Particle acceleration $a_1, a_2, a_3, \ldots$ Pressure $p_1, p_2, p_3, \ldots$ Density $\rho_1, \rho_2, \rho_3, \ldots$ The respective state can be given at different certain times $t_1, t_2, t_3, \ldots$ and at a certain positions $x_1, x_2, x_3, \ldots$. The subscripts indicate that these variable values are actually specific instances. In logic, they are called specified variable and therefore are concrete.

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Table B.40 Integrative levels of tasks in physics (Kristian Stålne, Michael L. Commons, and Eva Yujia Li).

Level	Characteristics
10. Abstract	Abstract variables are created by coordinating every possible outcome of the concrete instances, specific times or specific positions. The abstract state variables, or field variables as they are referred to, are used that coordinates every possible displacement u, velocity v, acceleration a, pressure p and density ρ (rho). At the abstract order, time and position are expressed as variables t and x. At the abstract order, the equation for pressure is provided. Even though the equation is from the systematic order, the variables themselves can be viewed as just variables. The equation is given and all a participant has to do is to put in the correct values for the derivatives. The definition provided for change force dF per change in unit area dS is $$p = \frac{dF}{dS}$$ The definition provided for density ρ (rho) is change in mass dm per change in unit volume dV $$\rho = \frac{dm}{dV}$$
11. Formal	At the formal order, field variables are expressed as single variable functions or deduced by derivation with respect to one variable. The very notion of a function, a mapping relating two variables, input and output, is always formal. At a fixed location $x = x_0$, $$u = u(t) = \hat{u}\cos(\omega t)$$ $$v = v(t) = \hat{v}\cos(\omega t)$$ $$a = a(t) = \hat{a}\cos(\omega t)$$ $$p = p(t) = \hat{p}\cos(\omega t)$$ $$\rho = \rho(t) = \hat{\rho}\cos(\omega t)$$ A letter such as u with the symbol is read "u hat". $\hat{u}$, $\hat{v}$, $\hat{a}$, $\hat{p}$, and $\hat{\rho}$ are the constant amplitudes and ω (omega) is the angular velocity which relates to the period time T according to $\omega = 2\pi / T$. At a fixed time $t = t_0$ the pressure in one dimension is $$p = p(x) = \hat{p}\cos(kx)$$ This corresponds to a snapshot of the pressure of a one dimensional travelling wave in a duct, such as an air shaft, as a function of the position x. k is the constant wave number, which can be seen as a spatial angular frequency with is related to the wavelength λ (lambda) according to $k = 2\pi / \lambda$.

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Table B.40 Integrative levels of tasks in physics (Kristian Stålne, Michael L. Commons, and Eva Yujia Li).

Level	Characteristics
12. Systematic	At the systematic order, the field variables are expressed as functions of more than one abstract variable. Here the field variables u, p, ρ, etc are expressed as functions of both time and location, according to, $u\,(x,t) = \hat{u}\sin(kx-\omega t)$ $p\,(x,t) = \hat{p}\cos(kx-\omega t)$ $\rho\,(x,t) = \hat{\rho}\sin(kx-\omega t)$ Kinematics describes the movement of particles expressed in particle displacement, velocity and acceleration. Velocity and acceleration are defined as the derivatives of displacement and velocity, respectively, with respect to time according to $v\,(x,t) = \frac{\partial}{\partial t}\left(u\,(x,t)\right)$ $a\,(x,t) = \frac{\partial}{\partial t}\left(v\,(x,t)\right)$ The field variables, which are functions at the systematic order, can be grouped into the three categories of kinematics – expressed in displacement, velocity or acceleration, force - expressed in pressure, and mass - expressed in density.

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Table B.40 Integrative levels of tasks in physics (Kristian Stålne, Michael L. Commons, and Eva Yujia Li).

Level	Characteristics
13. Metasystematic	The metasystematic order is characterized by coordination of two or more systems at the systematic order. Kinetics is achieved by means of Newton's law of motion in rigid body dynamics, which is the coordination of kinematics and force. The derivation of Newton's law of motion for a fluid is therefore a coordination at the metasystematic order, since it successfully coordinates the system of force through the pressure $p = p(x,t)$ with the system of kinematics through the acceleration $a = a(x,t)$. Using pressure $p(x,t)$ and particle velocity $v(x,t)$, Newton's law of motion for a fluid in one dimension can be expressed as, $$\rho_0 \frac{\partial v}{\partial t} = -\frac{\partial p}{\partial x}$$ where ρ_0 is the mean density of the fluid. Another example of a metasystematic coordination is the *Continuity Equation*, which is based on the principle of indestructibility of mass. It is a mathematical formulation of the relationship between changes in density $\rho(x,t)$ and changes in volume of an element, which can be expressed with the particle velocity of the element $v(x,t)$, as a function of time and position according to $$\frac{\partial \rho}{\partial t} = -\rho_0 \frac{\partial v}{\partial x}$$ A third example of a metasystematic coordination is the *Ideal Gas Law*, which gives a relationship between the pressure $p(x,t)$ and the density $\rho(x,t)$. From the ideal gas law the following equation can be derived, where the right hand side only contains constants. $$\frac{\partial p}{\partial \rho} = k \frac{\partial v}{\partial x}$$ It can be noted that these three examples of relationships at a metasystematic level coordinates the variables that reflects different aspects of the phenomenon, or categories, a wave motion studied as a propagation of force, displacement and mass.

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Table B.40 Integrative levels of tasks in physics (Kristian Stålne, Michael L. Commons, and Eva Yujia Li).

Level	Characteristics
14. Paradigmatic	At the paradigmatic order, the wave equation is derived by coordinating the three metasystematic relations presented above: Newton's law of motion The Continuity Equation (Conservation of Mass) The Ideal Gas Law The coordination is performed by employing the three Metasystematic relationships to eliminate two of the field variables, usually velocity and density, to achieve the final result, the wave equation expressed in pressure $p(x,t)$ as a field variable, $\frac{\partial^2 p}{\partial x^2} - \frac{1\partial^2 p}{c^2 \partial t^2} = 0$ The wave equation also shows up in quantum mechanics. The time-independent Schrödinger Equation is a decoordination of classical wave equation and the conservation of energy, Total Energy. $TE = PE + KE$, where PE = potential energy, KE = kinetic energy. The coordination is at the paradigmatic stage because the conservation of energy is at the metasystematic stage. The coordination of an action at the paradigmatic stage and an action of metasystematic stage completes a task at the paradigmatic stage. The following equation is a one-dimensional, time-independent Schrödinger Equation for a particle of mass m, commonly known as the Time-Independent Schrödinger Equation.
15. Cross-paradigmatic	At the cross-paradigmatic order, the field of quantum mechanics is reconciled with the theory of general relativity. Einstein realized that to accept the speed of light as being constant regardless of the position and speed of the observer is to establish a new space-time model of the universe. He derived the theory of special relativity by keeping the speed of light constant and making time and space flexible. Later, the theory of special relativity was expanded to the theory of general relativity. It made it possible for Einstein to explain gravity and its equivalence to momentum. The four dimensional space equations are described below. The reasons that the coordination is at the cross paradigmatic order 15 is that the relativity theories coordinated two paradigms at order 14. The first paradigm is the model of light waves propagating at a constant speed in vacuum. The second paradigm is the old paradigm of Newton's laws of mechanics positing a gravitational field within Euclidean geometry and founding mathematical physics. These two paradigms had intrinsic conflict with each other concerning the speed of light. Einstein reconciled the two by constructing a new cross-paradigmatic theory in which time, distance, an even mass, are all transformed by showing that all of them are a function of their relative speed with respect to the speed of light. The extension to the general relativity theory, integrates space-time with inertia and gravity. Because mass in their as in $E = mc^2$, this integrates a new physics, geometry.

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Table B.40 Integrative levels of tasks in physics (Kristian Stålne, Michael L. Commons, and Eva Yujia Li).

Level	Characteristics
16.	At order 16, the action required in the transition is to reflect on order 15 tasks. Scoring order 15 tasks is, but not completely, an order 16 task. It is in transition because one has to be at a higher stage in order to score the lower stages. An order 16 tasks requires a reflection on a stage 15 task and what is missing from it. The reason that it is transitional is that there is not a positive description of the order and how it coordinates two or more cross-paradigmatic order tasks. The order sequence presumably is infinite, but because of human limitations, we have created only 15 and possibly 16 orders.

Source: Excerpted from Stålne, Commons, and Li (2014, 63–66).

Table B.41 Integrative levels of reasoning about the AQAL framework (Zachary Stein)*.

Level	Reasoning about the Quadrants	Reasoning about the Levels
1. Abstract mappings	At this level, the *quadrants* are treated as simple categories into which different objects or events can be placed. Classic dichotomies are established in terms of the quadrants: Science is on right, Religion is on the left; Reason on the right, Feeling on the left; Body on the right, Mind on the left, etc. Generally the quadrants are taken as representing the existence of different kinds of *stuff* (i.e., they are read as an ontology). And Integral Theory is taken as a comprehensive map of what there is.	At this level, *developmental levels* are treated like simple stereotypes. Whole persons are classed as being *at* a level, which is typically understood in terms of a single developmental model (e.g., Spiral Dynamics). Development is understood as a kind of simple "growth to goodness," with ignorance at the bottom, science in the middle, and spirituality at the top. Particular levels gain more attention than others and function as more or less entrenched stereotypes, expressing preferences that are not necessarily developmental (e.g., "you are so green").
2. Abstract systems	At this level, reasoning about the *quadrants* involves a differentiation between their use as simple categories and their use as lenses or perspectives (i.e., *quadriva*). Appeals are made to the theorists, methods, and personal pronouns (I, WE, IT) identified with each quadrant, which begins a focus on the quadrants as *perspectives*. Attention is typically brought to the practical efficacy of applying the quadrants, in personal practice, business, and academia. Creative application is common. Also, the complex ways in which the quadrants frame other core elements of Integral Theory are elaborated; the internal consistency of Integral Theory as a whole is treated as a given.	At this level, reasoning about *levels* involves giving some primacy to the construct of *altitude*, which frames and organizes a variety of developmental models. Persons are understood in terms of their relative development in various *lines*, which are identified with the different developmental models and theorists. The concept of a *center of gravity* supplements this differentiated view and justifies whole person assessments. The relation between levels and other aspects of Integral Theory becomes explicit; the relation between *states* and levels complicates the simple notion that spirituality is "at the top." Generally, there are elaborate ideas about how developmental levels are implicated in all kinds of issues (politics, religion, ecology, etc.).

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Table B.41 Integrative levels of reasoning about the AQAL framework (Zachary Stein)*.

Level	Reasoning about the Quadrants	Reasoning about the Levels
3. Single principles	At this level, reasoning about the *quadrants* involves an emphasis on their world-disclosing and epistemological significance. They are taken as representing deep-seated aspects of human thought and practice. Explicit appeals are made to various comparable frameworks and the quadrants are thus understood in terms of a broad historical and evolutionary context. Thus Integral Theory is seen as the leading edge of a socio-cultural movement emphasizing comprehensive approaches to pressing problems and the integration of science and religion.	At this level, reasoning about *levels* involves explicit ideas about the limits and the affordances of different developmental methods and models, which are framed in terms of arguments about the conditions enabling their valid use (i.e., scoring systems, interview procedures, etc.). The idea of "growth to goodness" is problematized both by concerns over issues of horizontal health and intra-personal variability, and by concerns about the accuracy of different assessments methods. These complexities of method and application temper and complicate speculation on how developmental levels are implicated in a broad range of global problems.
4. Principled mappings	At this level, reasoning about the *quadrants* involves a radical and quasi-transcendental multi-perspectivalism, which is made explicit in terms of a widely applicable post-metaphysical mode of meta-theoretical argumentation. In light of this background, attention is brought to the provisional nature of all methods and models, especially meta-theoretical ones. Integral Theory is broadly construed as a polycentric and evolving network of ideas catalyzed by certain highly normative principles and practices (e.g., IMP, *non-exclusion, enactment, enfoldment*, etc.).	At this level, reasoning about *levels* involves the adoption of a post-metaphysical stance toward the task of evaluating people. The provisional, bounded and multi-perspectival nature of all models and methods is admitted and a set of meta-theoretical principles guides a recursive process of continually refining developmental models and methods in terms of both theory and practice. A broad and explicit philosophical discourse comes to supplement evaluate discussions concerning the notion of "growth to goodness," as the human potentials that characterize the highest levels and the future of civilization are seen as collective constructions for which we are responsible.

Source: Based on Stein (2010, 191: Table 7.1)

* As the author admits, this model presents a hypothetical reconstruction without empirical validation, M.K.

Table B.42 Integrative levels of personal action-logics (William R. Torbert).

Level	Characteristics
1. Impulsive	*Impulses rule behavior*
2. Opportunist	*Needs rule impulses* Short time horizon; focus on concrete things; often good in physical emergencies; deceptive; manipulative; views rules as loss of freedom; views luck as central; rejects critical feedback; externalizes blame; distrustful; stereotypes; fragile self-control; hostile humor; flouts unilateral power; sexuality; treats „what can get away with“ as legitimate; punishment = „eye for an eye“; positive ethic = even trade; timely action = „I win“
3. Diplomat	*Norms rule needs* Committed to routines; observes protocol; avoids inner and outer conflict; conforms; work to group standard; seeks membership, status; often speaks in favorite phrases, clichés, prefabricated jokes; face-saving essential; loyalty to immediate group; feels shame if violates norm; sin = hurting others; punishment = disapproval; positive ethics = nice, cooperative; timely action = „I’m on time“
4. Expert	*Craft logic rules norms* Interested in problem-solving; seeks causes; critical of self/others based on own craft logic; wants to stand out, be unique; perfectionist; chooses efficiency over effectiveness; dogmatic; accepts feedback only from objective acknowledged craft masters; values decisions based on technical merit; humor = practical jokes; sees contingencies, exceptions; positive ethic = sense of obligation to internally consistent moral order; timely action = fast, efficient
5. Achiever	*System effectiveness rules craft logic* Long-term goals; future is vivid, inspiring; welcomes behavioral feedback; timely action = juggling time demands to attain effective results; feels like initiator, not pawn; seek generalizable reasons for action; seek mutuality, not hierarchy, in relationships; appreciate complexity, systems; feels guilt if does not meet own standards; blind to own shadow, to the subjectivity behind objectivity; positive ethic = practical day-to-day improvements based on self-chosen (but not self-created) ethical system

(continued)

Table B.42 Integrative levels of personal action-logics (William R. Torbert).

Level	Characteristics
6. Individualist	*Reflexive awareness rules effectiveness* Takes a relativistic perspective; focuses more on both present and historical context; often aware of conflicting emotions; experiences time itself as a fluid, changeable medium, with piercing, unique moments; interested in own and other's unique self-expression; seek independent, creative work; attracted by difference and change more than by similarity and stability; less inclined to judge or evaluate; influences by listening and finding patterns more than by advocacy; may become something of a maverick; starts to notice own shadow (and own negative impact); possible decision paralysis
7. Strategist	*Self-amending principle rules reflexive awareness* Recognizes importance of principles, contract, theory, and judgment—not just rules, customs, and exceptions—for making and maintaining good decisions; high value on timely action inquiry, mutuality, and autonomy; attentive to unique market niches, particular historical moments; interweaves short-term goal-orientedness with long-term developmental process-orientedness; aware of paradox that what one sees depends on one's action-logic; creative at conflict resolution; enjoys playing a variety of roles; witty, existential humor; aware of and tempted by the dark side of power
8. Alchemist	*Process (interplay of principle/action) rules principles* Continually exercises own attention, seeking single-, double-, and triple-loop feedback on interplay of intuition, thought, action, and effects on outside world; anchors in inclusive present, appreciating light and dark, replication of eternal patterns and emergence of the previously implicit; stands in the tension of opposites, seek to blend them; intentionally participates in the work of historical/spiritual transformation; co-creator of mythical events that reframe situations; near-death experience, distintegration of ego-identity; treats time and events as symbolic, analogical, metaphorical (not merely linear, digital, literal)

Source: Excerpted from Torbert (2003, 74, 86, 102, 108, 126–27, 182).

Table B.43 Integrative levels of social conventions (Elliot Turiel).

Level	Age	Key features	Characteristics
1. Convention as descriptive of uniformity (affirmation)	6–7 years	Convention viewed as descriptive of uniformities in behavior. Convention is not conceived as part of structure or function of social interaction. Conventional uniformities are descriptive of what is assumed to exist. Convention maintained to avoid violation of empirical uniformities.	At the earliest level thus far identified the view of convention is straightforward and restricted. Insofar as these subjects are aware of, or assume the existence of, social uniformities, those behaviors are regarded as requiring maintenance just because they exist. Subjects at this level have not yet formed systematic notions of social organization. They are aware of differences in power and status (such as those between teachers and students or doctors and nurses), but these differences are not part of a conception of a systematized social organization. In the conventional realm it is thought that persons in positions of authority (e.g., a school principal) can set policy and tell others what to do. At this level uniformities are not understood to coordinate interactions within social systems. The necessity for convention is based on their existence; it is their presumed existence that makes uniformities binding.
2. Convention as descriptive of uniformity (negation)	8–9 years	Empirical uniformity not a sufficient basis for maintaining conventions. Conventional acts regarded as arbitrary. Convention is not conceived as part of structure or function of social interaction.	Instability stemming from inconsistencies in level 1 thinking leads to the level 2 negation of convention. At level 2 there is a recognition that if people were to engage in acts that do not comply with the existing uniformity (such as a boy becoming a nurse), then there would be no uniformity. The justification for affirming conventions is thus no longer accepted. At level 2 the possibility of variation is used as evidence for the non-necessity of customary associations of acts to types of persons. It is reasoned that one form of variation implies the non-necessity of the conventional usage.
3. Convention as related to rule and authority system (affirmation)	10–11 years	Convention seen as arbitrary and changeable. Adherence to convention based on concrete rules and authoritative expectations. Conception of conventional acts not coordinated with conception of rule.	The rejection of uniformity as a basis for convention and individual power as a basis for authoritative dictates means that level 2 subjects no longer have a conceptual context for convention. This leads to a new affirmation that rests on an emerging conception of institutionalized forms of convention. Level 3 is characterized by the emergence of a concrete conception of social structure, in which an integral role is attributed to rules and authorities. At level 3, however, conventions are regarded as nonarbitrary insofar as a rule or authority expectation exists, without a coordination of the function of rule or authority in relation to the conventional uniformity.

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Table B.43 Integrative levels of social conventions (Elliot Turiel).

Level	Age	Key features	Characteristics
4. Convention as related to rule and authority system (negation)	12–13 years	Convention now seen as arbitrary and changeable regardless of rule. Evaluation of rule pertaining to conventional act is coordinated with evaluation of the act. Conventions are "nothing but" social expectations.	At level 4 the shift is to focus on the acts and their relation to rules and authoritative expectations. Insofar as rules and expectations pertain to arbitrary acts, there is a negation of the necessity of adherence. As can be seen in responses characteristic of this level, there is an element of affirmation associated with the negations: If the acts do not have a basis in functions served by the rule, then the individual's choice is affirmed. The change from the third to the fourth level in the conception of rules pertaining to conventional acts results in the view that conventions are *nothing but* the expectations of others. At level 4 there is greater awareness than at level 3 of the general aims of social systems and of the inadequacy for achieving those aims of the belief in adherence to rules for their own sake. Thus, level 4 subjects accept systems of social interactions and their aims, but they have no means for coordinating those interactions.
5. Convention as mediated by societal standards (affirmation)	14–16 years	The emergence of systematic concepts of social structure. Convention as normative regulation in system with uniformity, fixed roles and static hierarchical organization.	At level 5 there is the emergence of an understanding of social interactions as forming an organization, in which the individual is considered part of a general collective and cultural system. The social system is now defined not mainly by the impositions of rules and authority, but as a system of organization that controls or guides the social interactions of its members. Social systems are regarded as hierarchically organized, with individuals described in terms of their roles and status within the hierarchy. Conventions are affirmed as shared behaviors, regulated and institutionalized by the broader system (often referred to by level 5 subjects as "society"), so that social acts are judges in relation to a group or social system to which the individual is subordinate. It is assumed that the conventional uniformities of a group, particularly at the societal level, are necessary for its maintenance. Although participation in a given group may be determined by individual choice, adherence to conventions is a necessary accommodation to groups in which one participates. Deviation from the uniformity would result in exclusion of the individual from the group or, if of a sufficient degree, can imply a breakdown of the social unit.

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Table B.43 Integrative levels of social conventions (Elliot Turiel).

Level	Age	Key features	Characteristics
6. Convention as mediated by societal standards (negation)	17–18 years	Convention regarded as codified societal standards. Uniformity in convention is not considered to serve the function of maintaining social system. Conventions are "nothing but" societal standards that exist through habitual use.	At level 6 conventions are regarded as codified standards of the social system, but there is now a negation of the necessity of such standards for the functions they are presumed to serve in given social tasks. Whereas the previous form of negation (level 4) included the assertation that conventions are "nothing but" the expectations of other people, at level 6 conventions are regarded as "nothing but" the expectations of "society." Uniformity, per se, is no longer regarded as a necessary condition for the adequate functioning of social systems. It is assumed that conventions exist not to serve functions but because they have become habitual and are perpetuated by tradition. At this level tradition means the existence of conventions that have become unquestioned standard procedures.
7. Functional view of conventions	18–25 years	Conventions as uniformities that are functional in coordinating social interactions. Shared knowledge, in the form of conventions, among members of social groups facilitate interaction and operation of the system.	At level 7 there is a rejection of conventions as societal code or as uniformities associated with the defining features of social systems. Instead, conventions are judged to have the function of coordinating social interactions and integrating elements of the social system. Conventions are thought to be stable and habitual uniformities because they serve to coordinate the interactions of people in ongoing organizational systems. In addition, conventions are not viewed as merely the means by which those with higher status impose their authority upon subordinates. Conventions are shared and agreed-upon modes of behavior that provide the means for mutual knowledge. The purpose of coordinating interactions is to facilitate the operation of the social system.

Source: Excerpted from Turiel (1983, 103, 106–12).

Table B.44 Integrative levels of concept formation (Lev S. Vygotsky).

Level	Characteristics
1. Syncretism	The young child takes the first step toward concept formation when he puts together a number of objects in an *unorganized congeries*, or "heap," in order to solve a problem that we adults would normally solve by forming a new concept. The heap, consisting of disparate objects grouped together without any basis, reveals a diffuse, undirected extension of the meaning of the sign (artificial word) to inherently unrelated objects linked by chance in the child's perception. At that stage, word meaning denotes nothing more to the child than a *vague syncretic conglomeration of individual objects* that have somehow or other coalesced into an image in his mind. Because of its syncretic origin, that image is highly unstable. In perception, in thinking, and in acting, the child tends to merge the most diverse elements into one unarticulated image on the strength of some chance impression. Claparède gave the name "syncretism" to this well-known trait of the child's thought. Pavel Blonsky called it the "incoherent coherence" of the child's thinking. We have described the phenomenon elsewhere as the result of a tendency to compensate for the paucity of well-apprehended objective relations by an overabundance of subjective connections and to mistake these subjective bonds for real bonds between things. These syncretic relations, and the heaps of objects assembled under one word meaning, also reflect objective bonds insofar as the latter coincide with the relations between the child's perceptions or impressions. Many words, therefore, have in part the same meaning to the child and to the adult, especially words referring to concrete objects in the child's habitual surroundings. The child's and the adult's meanings of a word often "meet," as it were, in the same concrete object, and this suffices to ensure mutual understanding.

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Table B.44 Integrative levels of concept formation (Lev S. Vygotsky).

Level	Characteristics
2. Thinking in complexes (pseudoconcepts)	The second major phase on the way to concept formation comprises many variations of a type of thinking that we shall call *thinking in complexes*. In a complex, individual objects are united in the child's mind not only by his subjective impressions but also by *bonds actually existing between these objects*. This is a new achievement, an ascent to a much higher level. If the first phase of the child's development is characterized by syncretic images playing the role of "concepts," the second phase brings about complexes that have a functional equivalence with real concepts. In place of the "incoherent coherence" of syncretic thinking comes the grouping of objects that are actually related to each other. When a child moves up to that level, he has partly overcome his egocentrism. He no longer mistakes connections between his own impressions for connections between things—a decisive step away from syncretism toward objective thinking. Thought in complexes is already coherent and objective thinking, although it does not reflect the relations between things in the same way as real conceptual thinking. The difference between this second phase and the third one, which concludes the ontogenesis of concept formation, lies in the peculiarity of complex thinking. Complexes are formed according to rules that differ significantly from the rules of real concept formation. Remains of complex thinking persist in the language of adults. Family names are perhaps the best example of this. Any family name, "Petrov," let us say, subsumes individuals in a manner closely resembling that of the child's complexes. The child at that stage of development thinks in family names, as it were; the universe of individual objects becomes organized for him by being grouped into separate, mutually related "families." In a complex, the bonds between its components are *concrete and factual* rather than abstract and logical, just as we do not classify a person as belonging to the Petrov family because of any logical relation between him and other bearers of the name. The question is settled for us by facts. The factual bonds underlying complexes are discovered through direct experience. A complex, therefore, is first and foremost a concrete grouping of objects connected by factual bonds. Since a complex is not formed on the plane of abstract logical thinking, the bonds that create it, as well as the bonds it helps to create, lack logical unity; they may be of many different kinds. *Any factually present* connection may lead to the inclusion of a given element into a complex. That is the main difference between a complex and a concept. While a concept groups objects according to one attribute, the bonds relating the elements of a complex to the whole and to one another may be as diverse as the contacts and relations of the elements are in reality.

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Table B.44 Integrative levels of concept formation (Lev S. Vygotsky).

Level	Characteristics
3a. Protoconcepts	In reality, the new formations do not necessarily appear only after complex thinking has run the full course of its development. In a rudimentary shape, they can be observed long before the child begins to think in pseudoconcepts. Essentially, however, they belong in the third division of our schema of concept formation. The principal function of complexes is to establish bonds and relations. Complex thinking begins the unification of scattered impressions; by organizing discrete elements of experience into groups, it creates a basis for later generalizations. But the advanced concept presupposes more than unification. To form such a concept it is also necessary *to abstract, to single out* elements, and to view the abstracted elements apart from the totality of the concrete experience in which they are embedded. In genuine concept formation, it is equally important to unite and to separate: Synthesis and analysis presuppose each other as inhalation presupposes exhalation (Goethe). In our experiment, the first step toward abstraction was made when the child grouped together *maximally similar* objects, e.g., objects that were small *and* round, or red *and* flat. Since the test material contains no identical objects, even the maximally similar are dissimilar in some respects. It follows that in picking out these "best matches," the child must be paying more attention to some traits of an object than to others—giving them preferential treatment, so to speak. An object no longer enters a complex *in toto*, with all its attributes—some are denied admission; if the object is impoverished thereby, the attributes that caused its inclusion in the complex acquire a sharper relief in the child's thinking. During the next stage in the development of abstraction, the grouping of objects on the basis of maximum similarity is superseded by grouping on the basis of a single attribute—e.g., only round objects or only flat ones. Although the product is indistinguishable from the product of a concept, these formations, like pseudoconcepts, are only precursors of true concepts. Following the usage introduced by Karl Groos, we shall call such formations *potential concepts*. Potential concepts, says Groos, can be viewed as a product of habit. In its most elementary form, the potential concept is an embodiment of a rule that situations having some features in common will produce similar impressions. Potential concepts already play a part in complex thinking, insofar as abstraction occurs also in complex formation. But as long as complex thinking predominates, the abstracted trait is unstable, has no privileged position, and easily yields its temporary dominance to other traits. In potential concepts proper, a trait once abstracted is not easily lost again among the other traits. The concrete totality of traits has been destroyed through its abstraction, and the possibility of unifying the traits on a different basis opens up.

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Table B.44 Integrative levels of concept formation (Lev S. Vygotsky).

Level	Characteristics
3b. True concepts	Only the mastery of abstraction, combined with advanced complex thinking, enables the child to progress to the formation of genuine concepts. A concept emerges only when the abstracted traits are synthesized anew and the resulting abstract synthesis becomes the main instrument of thought. The decisive role in this process, as our experiments have shown, is played by the word, deliberately used to direct all the subprocesses of advanced concept formation. It must be clear that words also fulfill an important, though different function in the various stages of thinking in complexes. Therefore, we consider complex thinking a stage in the development of verbal thinking. At the same time, the role played by the word in complex thinking by no means coincides with its role in conceptual thinking. On the contrary, the very difference between the complex and the concept lies in the different functional uses of the word. The word is a sign, and as such it may be used in different ways depending on what kind of intellectual operation it is involved in. From this difference in the intellectual operations with the word springs the difference between complex thinking and conceptual thinking. The transitional character of adolescent thinking becomes especially evident when we observe the actual functioning of the newly acquired concepts. Experiments specially devised to study the adolescent's operations with concepts bring out, in the first place, a striking discrepancy between his ability to form concepts and his ability to define them. The adolescent will form and use a concept quite correctly in a concrete situation, but will find it strangely difficult to express that concept in words, and the verbal definition will, in most cases, be much narrower than might have been expected from the way he used the concept. The same discrepancy occurs also in adult thinking, even at very advanced levels. This confirms the assumption that concepts evolve in ways differing from deliberate conscious elaboration of experience in logical terms. Analysis of reality with the help of concepts precedes analysis of the concepts themselves.

Source: Excerpted from Vygotsky (1986, 110–13, 135–41).

Table B.45 Integrative levels of consciousness (Jenny Wade).

Level	Primary motivation	Concept of other	Level of abstraction	Core assumption
1. Reactive	Cessation of discomfort	Adult humans or visual patterns suggesting human features responded to differently than other environmental features, but at a preconceptual level.	Abstractions do not exist. Rudimentary or universal template for three-dimensional spatialization of visual and auditory cues may organize perception. Physical objects may appear to be bounded spatially and, to a very limited extent, temporally.	I am the world, so my needs are met as they arise.
2. Naive	Physical security and safety at the level of sustenance, reproduction, and the avoidance of pain and change	Merged with other, particularly primary other. People not well differentiated from other animate beings in the environment.	Object permanence in space and time. Magical thinking. Pre-logical (efficacy and phenomenalism). Syncretic. Early preoperational or concrete reasoning. Concrete, minimal abstraction. Egocentric viewpoint; no social role.	The leader and I are one, therefore I am safe.
3. Egocentric	Survival of the mental ego as self	Environment, including objects and people, animals, and some rudimentary abstractions viewed as Alien Other. Other feared as potential threat to the self to be overcome by main force or manipulated for own ends. Subservient to others perceived to be more powerful. Domineering to others perceived to be less powerful. Peer relationships do not exist. People are not seen as equal to self.	Preconceptual to concrete operations. Animism less ascribed to objects, but now ascribed to abstractions.	If I can be tough enough, I will never die.

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Table B.45 Integrative levels of consciousness (Jenny Wade).

Level	Primary motivation	Concept of other	Level of abstraction	Core assumption
4. Conformist	Safety and security through predictability	People are similar in kind to subject, possessing their own point of view and interior life which may differ from the subject's. Primarily judged by externals, especially group identifications. Authority by virtue of rules and roles creates social inequities that are right and just.	Generalized other (allocentric). Social role. Dualistic; intolerant of ambiguity. Concrete to formal operations. Logical, complex, detailed, organized but ruled by emotion.	The universe is fair, so I can ensure my security by being good.
5. Achievement	Personal success that is socially recognized.	People are similar in kind to subject, possessing their own point of view and interior life of highly variegated emotions, but not similar in the ability to achieve. Achievers will be rewarded with the good things in life (usually defined materially) over the less capable. More powerful, successful people are admired. People without the measures of success important to the subject are discounted. Others may be exploited within socially acceptable limits.	Relativism. Dialectical relationships. Vantage point from a dialectic with the system, not entirely outside the system. Empiricism and positivism; materialism. Formal and post-formal operations. Logical, analytical, algorithmic, inferential.	I can be master of my fate through my own initiative.
or:				
5. Affiliative	Belonging in close, harmonious relationships.	People are similar in kind to subject, possessing their own point of view and interior life of highly variegated emotions. Sharing information about one's inner life with others will lead to a consensus-based community. Differences are superficial; everyone is fundamentally equal. Differences and conflict are threatening. People need to be helped by being in close relationships.	Relativism of knowledge. Dialectical relationships. Vantage point from a dialectic with the system, not entirely outside the system. Formal and post-formal operations, though this is not always evident. Holistic, intuitive, spatial, symbolic.	Enough love will conquer any difficulty.

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Table B.45 Integrative levels of consciousness (Jenny Wade).

Level	Primary motivation	Concept of other	Level of abstraction	Core assumption
6. Authentic	Personal growth for its own sake.	Very little ego-based distortion. True empathy. Respect for personal agency, diversity, and autonomy of others. Relatively free of enculturation and conformity to social expectations. Impatient with people who impede subject's personal progress.	Postformal operations. Systematic and metasystematic thinking perhaps even cross-paradigmatic. Whole-brain thinking. Highly original; thinks outside existing systems. Preference for ambiguity, uncertainty and paradox.	I need to be all that I can be to fulfill my purpose in life.
7. Transcendent	Transcending the egoic self to grasp the Absolute.	Appreciated for their participation in the Ground of All Being regardless of outward form. Great compassion for and identification with all life forms.	Holonomic, paradoxical epistemology. Spatial boundaries are open. All variables are interdependent. Reality is constructed. Reality is shaped by certain participants.	I seek to be one with the Ground of All Being.
8. Unity	None—merely living in the Ground of All Being	There are no others in the absolute sense. Recognition of the bounded selves that exist in the material plane as multiplicities of the One. Non-attached appreciation and compassion for, and identification with, others who are perfect as they are but are also suffering from attachment.	Holonomic. Direct, unmediated apperception of all phenomena. Fully integrated Newtonian and non-Newtonian realities.	I am What Is.

Source: Excerpted from Wade (1996, 74, 95, 110, 128, 134, 143, 155, 169, 190, 218, 263).

Table B.46 Integrative levels of mind (Ken Wilber).

Level	Characteristics
1. Sensorimotor (archaic/archaic-magic)	The human being at conception is a single-celled holon, embracing in itself, as junior holons, organelles, molecules, atoms, and subatomic particles, reaching all the way back into those dark shadows that fade into the evolutionary night. By the time of birth, the human being has developed from protoplasmic irritability to sensation to perception to impulse to proto-emotion, embracing each as a successive holon in its own compound individuality. But none of these functions is yet clearly *differentiated* (or integrated), and the first years of life are a quick coming-to-terms with the physiosphere and the biosphere both within and without, in preparation for the emergence of the noosphere, which begins in earnest around age two with the emergence of language. Thus Piaget, for example, in speaking of the first year of life, says that "the self is here *material*, so to speak." In the first place, the infant cannot easily distinguish between subject and object or self and material environment, but instead lives in a state of "primary narcissism" (Freud) or "oceanic adualism" (Arieti) or "pleromatic fusion" (Jung) or primary "indissociation" (Piaget). Sometime between the fourth and the ninth month, this archaic indissociation gives way to a *physical* bodyself *differentiated* from the *physical* environment—the "real birth" of the individual physical self. Margaret Mahler actually refers to it as "hatching." The *sensorimotor period* (0–2 years) is thus predominantly concerned with differentiating the *physical* self from the physical environment, and results, toward the end of the second year, in what Piaget calls physical "object permanence," the capacity of the infant to understand that physical objects exist independently of him or her (i.e., the physical world exists independently of one's egocentric wishes about it). Piaget is at pains to indicate that the process of differentiation/integration between internal and external world is a long and slow one. It is not, for example, that magico-animistic beliefs are present at one stage and then completely disappear at the next, but rather that cognitions referred to as "magical" become progressively less and less as development proceeds, moving from a "pure magical autism" to mental egocentricity to reciprocal and mutual sharing.

(continued)

Table B.46 Integrative levels of mind (Ken Wilber).

Level	Characteristics
2. Preoperational (magic/magic-mythic)	If all goes relatively well, the infant *transcends* the early archaic fusion state and emerges or hatches as a grounded physical self. But if the infant's physical body is now separated from the environment, its emotional body is not. The infant's *emotional* self still exists in a state of indissociation from other *emotional* objects, in particular the mothering one. But then, around eighteen months or so, the infant learns to *differentiate its feelings* from the *feelings of others*. Its own biosphere is differentiated from the biosphere of those around it—in other words, it transcends its embeddedness in the undifferentiated biosphere. By this time language has begun to emerge, and development in the noosphere begins in earnest. Thus, the intensity of the early archaic-magic declines with the differentiation of emotional self and emotional other (24–36 months)—but, according to Piaget*, magical cognitions continue to dominate the entire early preoperational period* (2–4 years), the period I simply call "magic." In other words, the first major layer of the noosphere is magical. During this period, the newly emerging images and symbols do not merely represent objects; they are thought to be concretely *part of the things they represent*, and thus "word magic" abounds. Piaget refers to such magical cognitions as a form of "participation"—that is, the subject and the object, and various objects themselves, are "linked" by certain types of adherences, or felt connections, connections that nonetheless violate the rich fabric of relations actually constituting the object. This is very much what Freud referred to as the primary process, which is governed by two general laws, that of displacement and that of condensation. In *displacement*, two different objects are equated or "linked" because they share similar parts or predicates (a relation of *similarity*: if one Asian person is bad, all Asians must be bad). In *condensation*, different objects are related because they exist in the same space (a relation of *contiguity*: a lock of hair of a great warrior "contains" in condensed form the power of the warrior). Put simply, such primary process or magical cognition is not yet capable of grasping the notion of a *holon*. It does not set whole and part in a rich network of *mutual* relationships, but short-circuits the process by merely collapsing or confusing various wholes and parts—what Piaget calls syncretism and juxtaposition. As we move from early preoperational (2–4 years; "magic") to late preoperational (4–7 years; "magic-mythic"), similar types of adherences continue to dominate awareness. But one crucial difference comes to the fore: magic proper—the belief that the subject can magically alter the object—diminishes rapidly. Continued interaction with the world eventually leads the subject to realize that his or her thoughts do not egocentrically control, create, or govern the world. The "hidden linkages" don't hold up in reality. Magic proper thus diminishes, or rather, the omnipotent magic of the individual subject—a magic that no longer "works"—is simply *transferred to other subjects*. Maybe I can't order the world around, but Daddy (or God or the volcano spirit) can. And thus onto the scene come crashing a hundred gods and goddesses, all capable of doing what I can no longer do: miraculously alter the patterns of nature in order to cater to my wants. Whereas in the earlier magical stages proper, the secret of the universe was to learn the right type of word magic that would *directly* alter the world, the focus now is to learn the right rituals and prayers that will make the gods and goddesses intervene and alter the world for me. It is from this magic-mythic structure that so many of the world's classical mythologies seem in large part to issue.

(continued)

Table B.46 Integrative levels of mind (Ken Wilber).

Level	Characteristics
3. Concrete operational (mythic/mythic-rational)	Assuming development goes relatively smoothly, then with the first significant differentiation of the mind and body, the mind can transcend its embeddedness in a merely bodily orientation—absorbed in itself (egocentric)—and begin to enter the world of other minds. But to do so it must learn to *take the role of other*—a new, emergent, and very difficult task. In other words, the self has gone from a *physiocentric* identity to a *biocentric* identity to an early *noospheric* identity, all of which are thoroughly *egocentric* and *anthropocentric*. If the sensorimotor and preoperational world is egocentric, the concrete operational world is *sociocentric* (centered not so much on a bodily identity as on a *role* identity). By far the most significant transformation or transcendence occurs in the capacity to *take the role of other*—not just to realize that others have a different perspective, but to be able to mentally reconstruct that perspective, to put oneself in the other's shoes. As Habermas would put it, a *role* identity supplements a *natural* (or bodily) identity (the body cannot take the role of other). The child learns his or her *role* in a society of *other roles*, and must now learn to *differentiate* that role from the role of others and then *integrate* that role in the newly emergent worldspace. The fundamental locus of self-identity thus switches from *egocentric* to *sociocentric*. This unavoidable (and initially necessary) "sociocentric embeddedness" leads to what is variously known as the *conventional stages* of morality (Kohlberg/Gilligan), the *belongingness* needs (Maslow), the *conformist* mode (Loevinger). Equally important to the taking of *roles* is the capacity of conop to work with mental *rules*. We saw that preop works with images (pictorial representation), symbols (nonpictorial representation), and concepts (which represent an entire class of things). Rules go one step further and *operate upon* concrete classes, and thus these rules (like multiplication, class inclusion, hierarchization) begin to grasp the incredibly rich relationships between various wholes and parts. That is, concrete operational is the first structure that can clearly grasp the nature of a holon, of that which in one relationship is a whole and *at the same time* in another relationship is merely a part (which is why *value holarchies* start to emerge spontaneously in children at this point; they switch from the rather strong "either-or" desires of preop to a *continuum of preferences*). No longer stuck in the physiosphere, stuck in the biosphere, or stuck in the early "egosphere," the pathological self is here stuck in the sociosphere, embedded in a particular society's rules and myths and dogmas, with no way to transcend that mythic-membership, and thus destined to play out the roles and rules of a particular and isolated society. Mythic-membership is sociocentric and thus *ethnocentric*: one is *in* the culture (a member of the culture) if one accepts the prevailing mythology, and one is excommunicated from the culture if the belief system is not embraced. In this structure, there is no way a global or planetary culture can even be conceived unless it involves the imposing of one's particular mythology on all peoples: which is just what we saw with the mythic-imperialism of the great empires, from the Greek and Roman to the Khans and Sargons to the Incas and Aztecs. These great empires all overcame the egocentrism of local and warring tribes by subsuming their regimes into that of the empire (thus negating and preserving them in a larger reach or communion), and this was accomplished in part by the umbrella of a mythology that unified different tribes, not by blood or kinship (for that is impossible, since each tribe has a different lineage), but rather by a common mythological origin that could unite the various roles (as the twelve Tribes of Israel were united by a common Yahweh).

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Table B.46 Integrative levels of mind (Ken Wilber).

Level	Characteristics
4. Formal operational	At this point, we are tracing the emergence of a strong rational ego out of its embeddedness in mythic-membership, and this brings us to Piaget's formal operational stage. Formal operational awareness transcends but includes concrete operational thought, and thus formop can *operate upon* the holons that constitute conop—and that, in fact, is the primary definition of *formal operational*. Where concrete operational uses rules of thought to transcend and operate on the concrete world, formal operational uses a new interiority to transcend and operate on the rules of thought themselves. It is a new differentiation allowing a new integration (and a *deeper* and *wider* identity). First and foremost, formal operational awareness brings with it a new world of feelings, of dreams, of wild passions and idealistic strivings. It is true that rationality introduces a new and more abstract understanding of mathematics, logic, and philosophy, but those are all quite secondary to the primary and defining mark of reason: *reason is a space of possibilities*, possibilities not tied to the obvious, the given, the mundane, the profane. Reason is the great gateway to the unseen, the beginning of the invisible worlds, which is usually the last way people think of rationality. But think of the great mystics such as Plato and Pythagoras, who saw rational Forms or Ideas as the grand patterns upon which all of manifestation was based, patterns that were utterly invisible to the eye of flesh and could only be seen interiorly, with the eye of mind. Piaget approaches this whole topic by showing that, whereas the concrete operational child can indeed operate upon the concrete world, the child at that stage ultimately remains tied to the obvious and the given and the phenomenal, whereas the formal operational adolescent will *mentally see* various and different possible arrangements of the given. In other words, this is a very *relational* type of awareness: all the possible relations that things can have with each other need to be held in awareness—and this is radically new. Formal operational awareness, then, is the first truly *ecological mode of awareness*, in the sense of grasping mutual interrelationships. The capacity to take different perspectives, we saw, begins in earnest with conop. But with the emergence of formop, all the various perspectives can be held in mind, however loosely, and thus all of them become *relative* to each other. In addition to formal operational awareness being ecological, relational, and nonanthropocentric, we have already mentioned several of its other properties: it is the first structure that is highly reflexive and highly introspective; it is experimental (or hypothetico-deductive) and relies on evidence to settle issues; it is universal as pluralism or perspectivism; and it is propositional (can understand "what if" and "as if" statements). With the coming of formop, the rules and norms of any given society can themselves be reflected upon and judged by more universal principles, principles that apply not just to this or that culture, or this or that tribe, but to the multiculturalism of universal perspectivism. Not "My country right or wrong," but "Is my country actually right?" Not concrete moral rules such as the Ten Commandments ("Thou shalt have no other gods before me"—intertribal squabbling), but more universal statements, principles of justice and mercy and compassion, of reciprocity and equality, based on mutual respect for individuals and the dictates of conscience based on *rights* (as an autonomous *whole*) and *responsibilities* (as a *part* of a larger whole). Thus Kohlberg, Gilligan, and Habermas (to name a few) all refer to this general stage as postconventional. Socrates versus Athens. Martin Luther King, Jr., versus segregation. Gandhi versus cultural imperialism.

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Table B.46 Integrative levels of mind (Ken Wilber).

Level	Characteristics
5. Vision-logic	The capacity to go within and look at rationality results in a *going beyond* rationality, and the first stage of that going-beyond is vision-logic. If you are aware of being rational, what is the nature of that awareness, since it is now bigger than rationality? To be aware of rationality is no longer to have only rationality, yes? Numerous psychologists (Bruner, Flavell, Arieti, Cowan, Kramer, Commons, Basseches, Arlin, etc.) have pointed out that there is much evidence for a stage beyond Piaget's formal operational. It has been called "dialectical," "integrative," "creative synthetic," "integral-aperspectival," "postformal," and so forth. I, of course, am using the terms *vision-logic* or *network-logic*. Because vision-logic transcends but includes formal operational, it completes and brings to fruition many of the trends begun with universal rationality itself (which is why many writers refer to vision-logic as "mature reason" or "dialectical reason" or "synthetic reason," and so on). And some theorists simply subdivide formal operational awareness into several substages, with the highest of those stages being what we are calling vision-logic. Take Habermas, for example (in *Communication and the Evolution of Society*). Formal operational rationality establishes the postconventional stages of, first, "civil liberties" or "legal freedom" for "all those bound by law," and then, in a more developed stage, it demands not just legal freedom but also "moral freedom" for "all humans as private persons." But even further, mature or communicative reason (our vision-logic) demands both "moral and political freedom" for "all human beings as members of a world society." Thus, where rationality began the *worldcentric* orientation of universal pluralism, vision-logic brings it to a mature fruition by demanding not just legal and moral freedom, but legal and moral and political freedom. In just the same way, ecological and relational awareness, which started to emerge with formal operational, comes to a major fruition with vision-logic and the centauric worldview. For, in beginning to *differentiate* from rationality (look at it, operate upon it), vision-logic can, for the first time, *integrate* reason with its predecessors, including life and matter, all as junior holons in its own compound individuality. In other words, and I intend to emphasize this heavily, centauric vision-logic can integrate physiosphere, biosphere, and noosphere in its own compound individuality (and this is the next major stage of leading-edge global transformation, even though most of the "work yet to be done" is still getting the globe up to decentered universal-rational pluralism in the first place). This overall integration (physiosphere, biosphere, and noosphere, or matter, body, mind) is borne out, for example, by the researches of Broughton, Loevinger, Selman, Maslow, and others. This integrative stage comes to fruition at Broughton's last major level (late centauric), where "*mind and body are both experiences of an integrated self*," which is the phrase I have most often used to define the centauric or bodymind-integrated self. But everything is not sweetness and light with the centaur. As always, new and higher capacities bring with them the potential for new and higher pathologies. As vision-logic adds up all the possibilities given to the mind's eye, it eventually reaches a dismal conclusion: personal life is a brief spark in the cosmic void. No matter how wonderful it all might be now, we are still going to die: *dread*, as Heidegger said, is the authentic response of the existential (centauric) being, a dread that calls us back from self-forgetting to self-presence, a dread that seizes not this or that part of me (body or persona or ego or mind), but rather the totality of my being-in-the-world. When I authentically see my life, I see its ending, I see its death; and I see that my "other selves," my ego, my personas, were all sustained by inauthenticity, by an *avoidance* of the awareness of lonely death. It is a soul that is much too awake. It is a soul on the brink of the transpersonal.

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Table B.46 Integrative levels of mind (Ken Wilber).

Level	Characteristics
6. Transpersonal	We have repeatedly seen that the problems of one stage are only "de-fused" at the next stage, and thus the only cure for existential angst is the transcendence of the existential condition, that is, the transcendence of the centaur, negating and preserving it in a yet higher and wider awareness. For we are here beginning to pass out of the noosphere and into the theosphere, into the transpersonal domains, the domains not just of the self-conscious but of the superconscious. A great number of issues need to be clarified as we follow evolution into the higher or deeper forms of transpersonal unfolding. First and foremost, if this higher unfolding is to be called "religious" or "spiritual," it is a very far cry from what is ordinarily meant by those terms. We have spent several chapters painstakingly reviewing the earlier developments of the archaic, magic, and mythic structures (which are usually associated with the world's great religions), precisely because those structures are what transpersonal and contemplative development *is not*. And here we can definitely agree with Campbell: if 99.9 percent of people want to call magic and mythic "real religion," then so be it for them (that is a legitimate use); but that is not what the world's greatest yogis, saints, and sages mean by mystical or "really religious" development, and in any event is not what I have in mind. Campbell, however, is quite right that a very, very few individuals, during the magic and mythic and rational eras, were indeed able to go beyond magic, beyond mythic, and beyond rational—into the transrational and transpersonal domains. And even if their teachings (such as those of Buddha, Christ, Patanjali, Padmasambhava, Rumi, and Chih-i) were snapped up by the masses and translated downward into magic and mythic and egoic terms—"the salvation of the individual soul"—that is not what their teachings clearly and even blatantly stated, nor did they intentionally lend any support to such endeavors. Their teachings were about the *release* from individuality, and not about its everlasting perpetuation, a grotesque notion that was equated flat-out with hell or samsara. Their teachings, and their contemplative endeavors, were (and are) transrational through and through. That is, although all of the contemplative traditions aim at going within and beyond reason, they all *start* with reason, start with the notion that truth is to be established by *evidence*, that truth is the result of *experimental* methods, that truth is to be *tested* in the laboratory of personal *experience*, that these truths are open to all those who wish to *try the experiment* and thus disclose *for themselves* the truth or falsity of the spiritual claims—and that dogmas or given beliefs are precisely what hinder the emergence of deeper truths and wider visions. Thus, each of these spiritual or transpersonal endeavors claims that there exist higher domains of awareness, embrace, love, identity, reality, self, and truth. The evidence, though still preliminary, strongly suggests that, at a minimum, *there are four general stages of transpersonal development*. These four stages I call the *psychic*, the *subtle*, the *causal*, and the *nondual*. I have for this presentation simply chosen four individuals who are especially representative of these stages. They are (respectively) Ralph Waldo Emerson, Saint Teresa of Ávila, Meister Eckhart, and Sri Ramana Maharshi. Each also represents the type of mysticism typical at each stage: nature mysticism, deity mysticism, formless mysticism, and nondual mysticism.

Source: Excerpted from Wilber (2000, 218–86).

Table B.47 Integrative levels of transpersonal mind (Ken Wilber).

Level	Characteristics
1. Para-mind (indigo) [formerly: psychic, M.K.]	At the para-mind (indigo), the person tends to drop the typical egoic body-mind identification and starts to experience a much broader, wider, vaster sense of individuality, reaching out and beyond the mind (or "aside" from the mind, which is what "para" means), sometimes expanding to the entire realm of nature, or the entire gross realm (occasionally further). It is at this level that the gross realm must be conjoined with, or fully objectified, if development is to continue (and this "conjunction" can occur across the broad spectrum of communion, union, or identity). In any event, knowing and feeling—consciousness and being—are felt as deeply interconnected, two aspects of the same Whole event. Because of that, the universe is seen, understood, and felt, not just as a physical realm, but as a profoundly psychophysical realm. The very concepts and ideas one uses to frame the world are seen, for the first time, to have a profound impact on how that realm appears and is experienced. This is different from the Pluralistic level's view about the importance of interpretation in unpacking experiences, because the latter is simply a view about how a separate epistemology affects, or helps to determine, a separate ontology (which, in its more extreme versions of social constructionism, does commit the standard version of the epistemic fallacy—all things are said to be nothing but "social constructions"—the world is *entirely* created by one's mode of knowing). But this 3rd-tier view is not a recognition of how two separate realms (knowing and being, or epistemology and ontology) affect each other but a direct experience of the underlying Whole that unites them both as correlative dimensions of the same Whole event, which can't be separated into two realms in the first place (which all 1st-tier levels do). Compassion, at 3rd tier (and beginning immediately with indigo, with intimations already present at turquoise), starts to include not only all humans ("worldcentric") but all sentient beings as well ("Kosmocentric"). Wholes are readily *seen*, and "thinking" (to the extent that that word has any meaning in 3rd tier) occurs primarily by moving from one prehended whole to the next prehended whole to the next. At indigo para-mind, those wholes are delivered primarily by the next cognitive stage up from vision-logic, which is, namely, not vision-logic but pure *vision* (what Aurobindo called "the illumined mind"). Spirituality here, as noted, is often of a "nature mysticism" variety (although higher forms are available), but that just means that spiritual intelligence at this level is profoundly psychophysical in its nature, understanding the deeply interwoven (and mutually enactive) character of consciousness and Kosmos at all levels.

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Table B.47 Integrative levels of transpersonal mind (Ken Wilber).

Level	Characteristics
2. Meta-mind (violet) [formerly: subtle, M.K.]	The meta-mind (violet) works primarily with a cognition of *feeling-awareness* (and felt Wholeness), which is capable of focusing on the timeless Now for certain stretches, while also capable of tracking long reaches of historical, or evolutionary, time. Feeling-awareness is particularly a unity of intellect and feelings, knowing and being, in an unbroken, seamless conjunction, with epistemology and ontology so tightly bound as to rarely even be distinguished, although the distinction is available to the meta-mind. The immediate "touchness" of feeling-awareness is similar to what Aurobindo meant when he called this stage "the intuitive stage," with "intuition" implying the immediate "touchness" that is so characteristic of feeling-awareness (although, "intuitive" is perhaps not the best name for this level, since it implies "intuition" is not available at lower levels, which simply isn't true). Various deep features at this meta-mind stage include rapid datascanning capacities; feeling-awareness of "felt Wholes"—where thinking proceeds immediate felt Whole by immediate felt Whole by immediate felt Whole, delivering up, at any moment of direct attention, the particular "Wholeness" being discerned at that point in the scan; luminous "visionary" awareness; profoundly creative processes; feelings of "shimmering," "gleaming," "incandescence," and "radiance" due to "luminous visionary" components; spirituality felt as especially "fecund" and "superabundant"; and a profound sensing of the surrounding environment as being one's own body, one's own skin.
3. Overmind (ultraviolet) [formerly: causal, M.K.]	In any event, Overmind is beyond what is typically called "mental" forms of awareness or knowing/being. Large stretches of transcendental dimensions tend to open up, and one of the common pathologies here is a tendency to "float" away from earth-bound relations and instead be absorbed in almost infinite stretches of love, light, luminosity, insight-awareness, audible illuminations, and structurally upward yearnings. Consciousness can become fascinated with itself and spend inordinate stretches absorbed in its own being, drawn to its own Source (the structureless, stateless ultimate Emptiness that can be directly conjoined with this structure). Forms of spiritual intelligence with Overmind include ones that are "transcendental" in tone, "luminous," "radiant vibrations" of consciousness, even reaching into the pure "formless mysticism" that can come with the conjoined Emptiness/Witness. But there is a real difference: namely, this is a formless "object-less" awareness that, right at its edge, runs into all of the previous levels' Forms (as structures that are "transcended and included" in the Overmind itself), and this allows the Overmind to "oversee" all lower knowledge/being/ideas/feelings, giving a particularly strong sense of "Fullness" as the Overmind reaches into all lower levels and infuses them with clarity, consciousness, sublimed feeling, and universal love-bliss.
4. Supermind (clear light) [formerly: nondual, M.K.]	Supermind is the radical crossroads where absolute and relative truth are not just exposed to each other, as with the Overmind, but are deeply and intrinsically one (or not-two) with each other, a "feature" of the Nondual state itself when joined with all previous structures. It is one of the most difficult nondual realizations for human beings to master since it's not just that "eternity is in love with the productions of time," but in a deeper, more mysterious fashion, eternity and time are the same, or not-two. The possibilities of Supermind are hard to even imagine, given the infinite depth of feeling that it brings, the unending horizon of knowing it possesses, the unlimited connectivity it feels with the Kosmos as its own inner Being and Divine Thusness.

Source: Excerpted from Wilber (2017, 220–45).

Appendix C Models of Integrative Levels of Knowing in Collective Development

Table C.1 Integrative levels of scientific and religious thought (Michael H. Barnes).

Level	Representatives	Cognitive style	Religious thought	Scientific thought
1. Primitive culture	Hunting-gathering societies. Earliest forms of genuinely human culture (e.g., tools, clothing, humanly constructed shelters, fire for cooking and warmth, formal burial, cave drawings, bone carvings); language had replaced genetic programming as the most powerful source of guidance	*Folktale-magical (preoperational, early concrete-operational)* Primitive cultures are oral cultures. They portray reality as a collection of people, things, and events, sometimes organized into multiple categories with many or most things in their correct place, though the boundaries of the categories are sometimes vague. Tradition and commonsense observation dictate what is true. It is the tradition of the group, its language categories and beliefs, that forms the commonsense knowledge of the people and tells them what they are observing.	*Animism* Primitive religion, if the name "religion" is appropriate, consists of beliefs and practices concerned with invisible beings and powers, which we now usually call spirits and magic. Primitive peoples believe in many spirits but they do not worship them. They deal with them as with parent figures or as difficult neighbors one must learn to get along with, but not as being requiring formal worship. Whether belief in magic counts as religion at all has long been argued. Nonetheless, it is safe to say that belief in spirits and magic is at least a kind of prereligion. Belief in spirits in particular is a basis for the later belief in other, much larger invisible living beings who can influence lives, the gods.	Whether primitive human thought has any relation to scientific thinking is disputed. On the one hand, it is possible to divide primitive from modern culture precisely by insisting on the difference between mythical superstition and rational science, as has so often been done. On the other hand, every science must begin with information and categorizing. Even the most primitive society collects data about its world in order to stay alive und functioning. Even the most primitive society can be exceedingly skilled in analyzing specific pieces of information, such as the age, condition, and amount of droppings of an animal worth hunting, or in constructing a hypothesis about fish in a river and testing that hypothesis by fishing methods.

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Table C.1 Integrative levels of scientific and religious thought (Michael H. Barnes).

Level	Representatives	Cognitive style	Religious thought	Scientific thought
2. Archaic culture	Agricultural, settled populations in villages and cities (e.g., ancient Mesopotamia, ancient Egypt)	*Literate-mythical (concrete-operational)* Eventually literacy was born, including bureaucratic record keeping as well as organized compilations of myths into lengthy hymns or poems. Information and stories could now grow more complex. The cognitive skills needed by a bureaucracy or priesthood became important enough to require a system of formal education.	*Polytheism* Here there is clearly religion: the formal worship of the gods in temples dedicated to such worship. The official and full-time priesthood now offers sacrifices and reads omens. Where there were once spirits alone, now there are also gods, spirits of enormous power, lording it over the spirits and humans alike, as kings rule erratically over their kingdoms. As a culture develops inner social, political, and economic organization, so also the realm of the invisible beings develops a hierarchical system.	In many places the practical information of archaic culture is already on its way toward a more formal science. The astronomical observations of the Babylonians to serve astrological purposes, the measuring techniques of the Egyptians to settle land disputes after the annual floods, and the irrigation techniques in various parts of the world, represent more complex use of information and cognitive methods.

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Table C.1 Integrative levels of scientific and religious thought (Michael H. Barnes).

Level	Representatives	Cognitive style	Religious thought	Scientific thought
3. Classical ("axial") culture	Ancient civilizations including China, India, Persia, Judea, and Greece	*Systematic-theoretical (early formal-operational)* It is the age of the great "classical" civilizations. The notion of a single and ultimate unity to all reality arose in China, India, Persia, Judea, and Greece. In Greece, China, and India, philosophers (who were sometimes also what we would call both theologians and scientists) self-consciously sought the overall structures of all things at once. They moved from reliance on tradition and commonsense observation to reliance on systematically logical explanatory theories of universal scope.	*Universalizing belief* A great shift in religious thought was part of the axial change. In the sixth century BCE the great universalist religions appear. In China traditional notions of yin and yang provided the background for belief in a universal and ultimate Tao. Notions of the transmigration of souls and divine power in India produced belief in the Ultimate named Brahman or Atman while logically systematic reflections were transforming traditional polytheism into classical forms of religion, in some cases subordinating the gods to a higher Reality or even ignoring the gods. It is in parts of the Rig Veda that were written most recently, probably no earlier than 800 BCE, that there is speculation about the ultimate transcend reality. By the time of the Babylonian Exile the Judean god, Yaweh, became the Creator God of the universe. The Greeks proposed candidates for supreme divinity, in the form of Plato's One, or the Stoics' Logos, or Aristotle's Unmoved Mover.	The theoretical speculations of the classical age were ambitious (e.g., Parmenides, Platon, Aristotle, Hui Shih, Mo-tzu). Theorizing far outran the evidence available. But out of this search for overall logical explanatory coherence came reflections on the universal demands of justice, or on the ultimate nature of truth and truthfulness, or on pure ideals of government and public morals, and much else that cultures still cherish. Out of these speculations came the beginnings of a new form of science. Aristotle studied biological differences, formulated theories of why the sea is salty, and analyzed the movement of the stars, all through a comparison of various theoretical possibilities in relation to available evidence.

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Table C.1 Integrative levels of scientific and religious thought (Michael H. Barnes).

Level	Representatives	Cognitive style	Religious thought	Scientific thought
4. Empirical-critical culture	Skepticism in Europe, China, or India; modern science	*Empirical-critical* *(late formal-operational)* To the criterion of logical consistency has been added a new emphasis on ongoing and public empirical testing, of subjecting every theory, no matter how logically appealing, to open-ended testing against the evidence. This is modern "empirical-critical" method in science. A defining aspect of empirical-critical thought has been the conviction that neither commonsense observation and tradition nor logical explanatory theorizing is entirely reliable, that we must continuously engage in a public empirical testing of even our own favorite truth-claims, even at the expense of our own biases and special interests in making those claims. This constitutes a self-reflecting (or "reflexive") awareness that knowledge is conditional and tentative; that every interpretation of reality, no matter how wonderfully coherent or consistent with the apparent evidence, is the product of human thinking; that it is an interpretation and not the simple truth, one interpretation among a range of possibilities.	*Reflexive* Religious thought has been affected by the rise of the empirical-critical method, though the response of religion is varied, from the existential leap of faith to the redefinition of religion as emotive-expressive or cultural-linguistic. As the cognitive style of the culture has shifted, some religious thought has incorporated much of that shift (though other contemporary religious thought defines itself precisely as a rejection of both modern rationalism and skepticism).	While classical or axial revolution appeared in what we now call philosophy and theology and science all in one, the current revolution has been most evident specifically in the growth of science. This revolution is not quite what the early scientists were preparing themselves for. In fact, to many of the early scientists the empirical-critical approach appeared to be a skepticism that was opposed to their great project of discovering the real truth about the universe. But science has an ironic nature. While it has been extremely successful in discovering things about this universe that had long eluded the most insistent questionings of humankind, at the same time its continuing successes have been dependent on a willingness to doubt all observations and theories, to leave them open to further testing by any critic, to treat them as models for interpreting reality rather than as simple truth. Science, ironically, knows more by doubting more.

Source: Excerpted from Barnes (2000, 23–30).

Table C.2 Integrative levels of religion (Robert N. Bellah).

Level	Religious symbol system	Religious action	Religious organization	Social implications
1. Primitive	The *religious symbol system* at the primitive level is characterized by Levy-Bruhl as "*le monde mythique*," and Stanner directly translates the Australians' own word for it as "the Dreaming." The Dreaming is a time out of time, or in Stanner's words, "everywhen," inhabited by ancestral figures, some human, some animal. Though they are often of heroic proportions and have capacities beyond those of ordinary men as well as being the progenitors and creators of many particular things in the world, they are not gods, for they do not control the world and are not worshipped. Two main features of this mythical world of primitive religion are important for the purposes of the present theoretical scheme. The first is the very high degree to which the mythical world is related to the detailed features of the actual world. Not only is every clan and local group defined in terms of the ancestral progenitors and the mythical events of settlement, but virtually every mountain, rock and tree is explained in terms of the actions of mythical beings. The second main feature, not unrelated to the extreme particularity of the mythical material, is the fluidity of its organization. Lienhardt, though describing a religion of a somewhat different type, catches the essentially free-associational nature of primitive myth when he says, "We meet here the typical lack of precise definition of the Dinka when they speak of divinities." Examples: Dinka religion, Australian Aboriginal religion	Primitive *religious action* is characterized not, as we have said, by worship, nor, as we shall see, by sacrifice, but by identification, "participation," acting-out. Just as the primitive symbol system is myth *par excellence*, so primitive religious action is ritual *par excellence*. In the ritual the participants become identified with the mythical beings they represent. The mythical beings are not addressed or propitiated or beseeched. The distance between man and mythical being, which was at best slight, disappears altogether in the moment of ritual when everywhen becomes now. There are no priests and no congregation, no mediating representative roles and no spectators. All present are involved in the ritual action itself and have become one with the myth.	At the primitive level *religious organization* as a separate social structure does not exist. Church and society are one. Religious roles tend to be fused with other roles, and differentiations along lines of age, sex and kin group are important.	As for the *social implications* of primitive religion, Durkheim's analysis seems still to be largely acceptable. The ritual life does reinforce the solidarity of the society and serves to induct the young into the norms of tribal behavior. The very fluidity and flexibility of primitive religion is a barrier to radical innovation. Primitive religion gives little leverage from which to change the world.

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Table C.2 Integrative levels of religion (Robert N. Bellah).

Level	Religious symbol system	Religious action	Religious organization	Social implications
2. Archaic	The characteristic feature of archaic religion is the emergence of true cult with the complex of gods, priests, worship, sacrifice and in some cases divine or priestly kingship. In the archaic *religious symbol system* mythical beings are much more definitely characterized. Instead of being great paradigmatic figures with whom men in ritual identify but with whom they do not really interact, the mythical beings are more objectified, conceived as actively and sometimes willfully controlling the natural and human world, and as beings with whom men must deal in a definite and purposive way—in a word they have become gods. Relations among the gods are a matter of considerable speculation and systematization, so that definite principles of organization, especially hierarchies of control, are established. Especially where at least craft literacy has been attained, the mythical tradition may become the object of critical reflection and innovative speculation which can lead to new developments beyond the nature of archaic religion. Examples: Religious systems of much of Africa and Polynesia and some of the New World, as well as the earliest religious systems of the ancient Middle East, India and China.	Archaic *religious action* takes the form of cult in which the distinction between men as subjects and gods as objects is much more definite than in primitive religion. Because the division is sharper the need for a communication system through which gods and men can interact is much more acute. Worship and especially sacrifice are precisely such communication systems. The main difference is that instead of a relatively passive identification in an all-encompassing ritual action, the sacrificial process, no matter how stereotyped, permits the human communicants a greater element of intentionality and entails more uncertainty relative to the divine response. Through this more differentiated form of religious action a new degree of freedom as well, perhaps, as an increased burden of anxiety enters the relations between man and the ultimate conditions of his existence.	Archaic *religious organization* is still by and large merged with other social structures, but the proliferation of functionally and hierarchically differentiated groups leads to a multiplication of cults, since every group in archaic society tends to have its cultic aspect. The emergence of a two-class system, itself related to the increasing density of population made possible by agriculture, has its religious aspect. The upper-status group, which tends to monopolize political and military power, usually claims a superior religious status as well.	The *social implications* of archaic religion are to some extent similar to those of primitive religion. The individual and his society are seen as merged in a natural-divine cosmos. Traditional social structures and social practices are considered to be grounded in the divinely instituted cosmic order and there is little tension between religious demand and social conformity. Indeed, social conformity is at every point reinforced with religious sanction.

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Table C.2 Integrative levels of religion (Robert N. Bellah).

Level	Religious symbol system	Religious action	Religious organization	Social implications
3. Historic	The *symbol systems* of the historic religions differ greatly among themselves but share the element of transcendentalism which sets them off from the archaic religions; in this sense they are all dualistic. The strong emphasis on hierarchical ordering characteristic of archaic religions continues to be stressed in most of the historic religions. Not only is the supernatural realm "above" this world in terms of both value and control but both the supernatural and earthly worlds are themselves organized in terms of a religiously legitimated hierarchy. In one sense historic religions represent a great "demythologization" relative to archaic religions. The notion of the one God who has neither court nor relatives, who has no myth himself and who is the sole creator and ruler of the universe, the notion of self subsistent being, or of release from the cycle of birth and rebirth, are all enormous simplifications of the ramified cosmologies of archaic religions. Nonetheless, relative to earlier forms the historic religions are all universalistic. From the point of view of these religions a man is no longer defined chiefly in terms of what tribe or clan he comes from or what particular god he serves but rather as a being capable of salvation. From the point of view of these religions a man is no longer defined chiefly in terms of what tribe or clan he comes from or what particular god he serves but rather as a being capable of salvation. That is to say that it is for the first time possible to conceive of man as such. Examples: Confucianism, Buddhism, Judaism, Hebrew prophets, Christianism, Islam	*Religious action* in the historic religions is thus above all action necessary for salvation. Even where elements of ritual and sacrifice remain prominent they take on a new significance. In primitive ritual the individual is put in harmony with the natural divine cosmos. His mistakes are overcome through symbolization as part of the total pattern. Through sacrifice archaic man can make up for his failures to fulfill his obligations to men or gods. He can atone for particular acts of unfaithfulness. But historic religion convicts man of a basic flaw far more serious than those conceived of by earlier religions. The identity diffusion characteristic of both primitive and archaic religions is radically challenged by the historic religious symbolization, which leads for the first time to a clearly structured conception of the self.	Historic religion is associated with the emergence of differentiated religious collectivities as the chief characteristic of its *religious organization*. The profound dualism with respect to the conception of reality is also expressed in the social realm. The single religio-political hierarchy of archaic society tends to split into two at least partially independent hierarchies, one political and one religious. Together with the notion of a transcendent realm beyond the natural cosmos comes a new religious elite that claims direct relation to the transmundane world.	The *social implications* of the historic religions are implicit in the remarks on religious organization. The differentiation of a religious elite brought a new level of tension and a new possibility of conflict and change onto the social scene. Religion, then, provided the ideology and social cohesion for many rebellions and reform movements in the historic civilizations, and consequently played a more dynamic and especially a more purposive role in social change than had previously been possible.

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Table C.2 Integrative levels of religion (Robert N. Bellah).

Level	Religious symbol system	Religious action	Religious organization	Social implications
4. Early modern	In all previous stages the ideal type was based on a variety of actual cases. Now for the first time it derives from a single case or at best a congeries of related cases, namely, the Protestant Reformation. The defining characteristic of early modern religion is the collapse of the hierarchical structuring of both this and the other world. Either conformity to religious law, or participation in a sacramental system or performance of mystical exercises was necessary for salvation. Early modern *religious symbolism* concentrates on the direct relation between the individual and transcendent reality. A great deal of the cosmological baggage of medieval Christianity is dropped as superstition. The fundamentally ritualist interpretation of the sacrament of the Eucharist as a re-enactment of the paradigmatic sacrifice is replaced with the anti-ritualist interpretation of the Eucharist as a commemoration of a once-and-for-all historical event. Examples: Protestant Reformation, certain tendencies in Islam, Buddhism, Taoism and Confucianism	*Religious action* was now conceived to be identical with the whole of life. Special ascetic and devotional practices were dropped as well as the monastic roles that specialized in them and instead the service of God became a total demand in every walk of life. The stress was on faith, an internal quality of the person, rather than on particular acts clearly marked "religious."	I have already noted that early modern religion abandoned hierarchy as an essential dimension of its religious symbol system. It did the same in its *religious organization*. Not only did it reject papal authority, but it also rejected the old form of the religious distinction between two levels of relative religious perfection. The roles of church member and citizen were but two among several. Both church and state had their delimited spheres of authority, but with the full institutionalization of the common law neither had a right to dominate each other or the whole of society.	Whereas in most of the historic civilizations religion stands as virtually the only stable challenger to the dominance of the political elite, in the emerging early modern society religious impulses give rise to a variety of institutional structures, from the beginning or very soon becoming fully secular, which stand beside and to some extent compete with and limit the state. The direct religious response to political and moral problems does not disappear but the impact of religious orientations on society is also mediated by a variety of worldly institutions in which religious values have been expressed.

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Table C.2 Integrative levels of religion (Robert N. Bellah).

Level	Religious symbol system	Religious action	Religious organization	Social implications
5. Modern	It is difficult to speak of a *modern religious symbol system*. It is indeed an open question whether there can be a religious symbol system analogous to any of the preceding ones in the modern situation, which is characterized by a deepening analysis of the very nature of symbolization itself. At the highest intellectual level I would trace the fundamental break with traditional historic symbolization to the work of Kant. By revealing the problematic nature of the traditional metaphysical basis of all the religions and by indicating that it is not so much a question of two worlds as it is of as many worlds as there are modes of apprehending them, he placed the whole religious problem in a new light. The entire modern analysis of religion, including much of the most important recent theology, though rejecting Kant's narrowly rational ethics, has been forced to ground religion in the structure of the human situation itself. In this respect the present paper is a symptom of the modern religious situation as well as an analysis of it. Examples: Liberal theology, Paul Tillich's "ecstatic naturalism," Rudolf Bultmann's "demythologization", Dietrich Bonhoeffer's "religionless Christianity," Uchimura Kanzo's "non-church Christianity," similar developments in Jodo Shinshu and Mahayana Buddhism.	*Religious action* in the modern period is, I think, clearly a continuation of tendencies already evident in the early modern stage. Now less than ever can man's search for meaning be confined to the church. But with the collapse of a clearly defined doctrinal orthodoxy and a religiously supported objective system of moral standards, religious action in the world becomes more demanding than ever. The search for adequate standards of action, which is at the same time a search for personal maturity and social relevance, is in itself the heart of the modern quest for salvation, if I may divest that word of its dualistic associations.	In the modern situation as I have defined it, one might almost be tempted to see in Thomas Paine's "My mind is my church," or Thomas Jefferson's "I am a sect myself" the typical expression of *religious organization* in the near future. Nonetheless it seems unlikely that collective symbolization of the great inescapabilities of life will soon disappear. The tendency in more recent periods has been to continue the basic pattern but with a much more open and flexible pattern of membership.	Here I can only suggest what I take to be the main *social implication* of the modern religious situation. Early modern society, to a considerable degree under religious pressure, developed, as we have seen, the notion of a self-revising social system in the form of a democratic society. It is the chief characteristic of the more recent modern phase that culture and personality themselves have come to be viewed as endlessly revisable.

Source: Excerpted from Bellah (1964, 361–73).

Table C.3 Integrative levels of numerical concepts and arithmetic thought (Peter Damerow).

Level	Arithmetic	Characteristics	Period	Date
1.	Pre-arithmetical quantification	No arithmetic activities. All judgments about quantities are based on direct comparisons of amounts and sizes. Communication and transmission only by transmittable techniques of comparison and by comparative expression of language.	Approximately until the end of the Mesolithic period	Up to 10,000 BCE
2.	Protoarithmetic	Quantities are precisely identified by one-to-one correspondences. Communication und transmission with the aid of conventionalized counting sequences and tallying systems.	Neolithic period and Early Bronze Age	10,000 – 3,000 BCE
3.	Symbol-based arithmetic with context-dependent symbol systems	Quantities are structured by metrological systems. Communication and transmission of these systems and of the corresponding mental constructs through complex symbols and developed techniques for the transformation of symbol configurations.	Period of early city cultures (until the invention of the sexagesimal place value system in the ancient Near East)	3,000 – 2,000 BCE
4.	Symbol-based arithmetic with context-independent symbol systems	Quantities are structured by abstract numerical systems with object-independent arithmetical operations. Communication and transmission of these systems by unified, context-independent, but culture-specific symbol systems for the representation of arbitrary quantities, including abstract “rules of calculation.” Emergence of first forms of “preclassical mathematics” that are abstract but dependent on culture-specific symbol systems.	Period of developed city cultures (in the ancient Near East)	2,000 – 500 BCE

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Table C.3 Integrative levels of numerical concepts and arithmetic thought (Peter Damerow).

Level	Arithmetic	Characteristics	Period	Date
5.	Concept-based arithmetic with deduction in natural language	Abstract number concept with "a priori" provable properties. Communication and transmission with the aid of a written representation of "propositions" about abstract numbers and their mathematical properties. Propositions are logically ordered and systematically arranged by deductive theories according to the model of Euclid's *Elements*.	Classical antiquity, late antiquity, Middle Ages, and early modern era (until the emergence of analytical mathematics)	500 BCE – late 19th century CE
6.	Concept-based arithmetic with formal deductions	Formal understanding of arithmetical structures and expansion of the number concept by construction of new arithmetical structures. Communication and transmission with the aid of formal language systems.	The modern mathematical tradition	Since late 19th century CE

Source: Based on Damerow (1999, 52).

Table C.4 Integrative levels of worldviews (Annick De Witt and Nicholas Hedlund).

Level	Ontology	Epistemology	Axiology	Anthropology	Societal vision
1. Traditional	Religious/metaphysical monism. Reality as singular, transcendent. Universe as purposively constructed whole. God-created universe *ex nihilo*. Transcendent God/Creator is separate from profane world; dualism. Nature as embodiment of meaningful, imposed order (e.g., God's creation).	Naïve realism; emphasis on concrete-literal interpretations of religious doctrine (literalism, dogmatism). Religious/conventional authority (scripture, divine revelation, tradition). Implicit methodology. Substantive rationality.	Traditional values (e.g., security, tradition, conformity, obedience, humility). Emphasis on community, family. Preconventional morality?	Humanity in managerial stewardship role vis-à-vis nature. Prime purposes determined by larger order and social roles. Human being as sinful/fallen from grace. Dependent on religious/metaphysical authorities for salvation. Ethnocentric identity?	Traditional societies, emphasis on (subsistence) farming. Traditional and religious authorities and values as source of solutions to societal and environmental problems.
2. Modern	Secular materialism. Reality as singular, immanent. Mechanistic universe brought about by random selection. Material reality devoid of meaning, intentionality, consciousness; dualism, disenchantment. Nature as instrumental, devoid of intrinsic meaning and purpose. Resource for exploitation.	(Post-)positivism; emphasis on reality as objectively knowable (empiricism, reductionism, scientism). Secular authority (science, the state). Quantitative methods; methodological monism. Procedural rationality.	Rational-secular, materialist values (e.g., power, achievement, hedonism, stimulation). Emphasis on independent individuality. Conventional morality?	Humanity in promethean control over nature. Prime purposes of a material, hedonistic nature. Human being as self-optimizing, independent being. *Homo economicus*. Sociocentric identity?	Industrial societies, emphasis on mechanized modes of production (e.g. industrial/conventional agriculture). Technological optimism: science and technology as solutions to societal and environmental problems.

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Table C.4 Integrative levels of worldviews (Annick De Witt and Nicholas Hedlund).

Level	Ontology	Epistemology	Axiology	Anthropology	Societal vision
3. Postmodern	Postmaterialism. Reality as pluralistic, perspectival, constructed. Multiple cosmogonies/cosmogony as social construct. Reality as discontinuous and fragmented, meaning as social construct; antiessentialism. Nature as constructed through a plurality of cultural values, meanings, and interests.	Social constructivism; emphasis on reality as constructed (pluralism, relativism). Internalization of authority (e.g., moral, emotional, intuitive, artistic knowing) Qualitative methods; methodological pluralism Skeptical rationality?	Self-expression, post-materialist values (e.g., openness to change, self-direction). Emphasis on unique individuality. Postconventional morality?	Humanity in cautious relationship to nature. Prime purposes are found within, intrinsic. Human being as selfexpressing, unique individual. Worldcentric identity?	Postindustrial societies, emphasis on service economy and creative industries. Scepticism of status quo, idealism: mobilization of the public through revealing injustices as prime solution to societal and environmental problems.
4. Integrative	Holism/integralism (unity in diversity). Reality as transcendent *and* immanent. Universe as evolving, creative manifestation of source/spirit. Outer and inner reality co-arising, interdependent; reenchantment. Nature as intrinsically valuable. Frequently seen as divine force that humanity is part and expression of.	Critical realism, pragmatism; emphasis on reality as approachable through integration of sources of knowledge. Triangulation of authority (scientific, spiritual/ religious/philosophical, and subjective knowing). Mixed methods; integrative pluralism. Synthetic rationality?	Self-expression/self-transcendence values (e.g., universalism, self-actualization)? Emphasis on embedded, relational individuality, Universal morality?	Humanity in unity and synergy with nature. Prime purposes found within, serving the larger whole ("service through self-actualization"). Human being as evolutionary cocreator, with a vast—though generally unrealized—potential. Planetcentric identity?	Increasing emphasis on services, creative industries, and social/sustainable entrepreneurship. Integrative vision: emancipation of the public through consciousness growth and a synthesis of interests and perspectives as solutions to societal and environmental problems.

Source: Based on De Witt and Hedlund (2017, 318–19: Table 12.2).

Table C.5 Integrative levels of cognition and culture (Merlin Donald).

Level	Representatives	Characteristics
1. Episodic	Primates	*Episodic event perception (self-awareness and event sensitivity)* Episodic awareness is defined primarily by elaborate event representation. For an episodically competent mind, experience is not normally remembered as a confusion of objects, actions, colors, or raw sensations but as a series of events. These events are the givens, the raw data, of its memory, which consists of experience that has been segmented into and remembered as a sequence of discrete episodes. All mammals do this to some extent. A typical mammalian episode might be eating food in a certain place, or marking a territorial boundary, or battling a rival, or being chased by a farmer. Each episode is composed of hundreds of simpler bound percepts, which are batched together into coherent chunks. This batching process can be regarded as a kind of metabinding. This memory for specific, coherent, detailed events is the essence of episodic cognition.
2. Mimetic	Early hominids	*Action metaphor (skill, gesture, mime, and imitation)* The first transition started a little more than two million years ago, when the species *Homo* first appeared on Earth. The achievements of early hominids revolved around a new kind of cognitive capacity, mimetic skill, which was an extension of conscious control into the domain of action. It enabled playacting, body language, precise imitation, and gesture. It also acted as a mode of cultural expression and solidified a group mentality, creating a cultural style that we can still recognize as typically human. Mimesis enabled early hominids to refine many skills, including cutting, throwing, manufacturing tools and making intentional vocal sounds. Although not yet language, these sounds were nevertheless expressive. We call such vocal modulations prosody. They include deliberately raising and lowering the voice, and producing imitations of emotional sounds.

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Table C.5 Integrative levels of cognition and culture (Merlin Donald).

Level	Representatives	Characteristics
3. Mythic	Sapient humans	*Language, symbolic representation (oral traditions, mimetic ritual, narrative thought)* The second transition started with the arrival of archaic *Homo sapiens*, about half a million years ago. It culminated in the evolution of our particular subspecies, *Homo sapiens sapiens*, about 125,000 years ago. During this time the brain and vocal tract underwent a great change. Sapient humans started with the rather primitive material culture they inherited from their predecessor but then began to innovate at a much higher rate. They invented a wider range of sophisticated tools and produced beautifully crafted objects, improved shelters and hearths, and elaborate graves. Within another 10,000 years, they had started to use several forms of self-adornment and were manufacturing a very large variety of multipart objects, including weapons, hafted tools, boats, complex dwellings, ritual quasi-symbolic artifacts, and simple musical instruments. They had also migrated over much of the world, using various technologies to adapt to a variety of climates and ecologies. They came to dominate the Earth, and spoken language was undoubtedly the special power that favored them over their rivals and predecessors. Spoken language produced oral culture, which was the universal form of human culture until very recently.
4. Theoretic	Modern culture	*External symbolic universe (formalism, large-scale theoretic artifacts, massive external storage)* The third transition started about forty thousand years ago, and revolved around a revolution in the technology of symbols. Cognition continued to evolve, but this time it was mostly driven by technology and culture itself. The main cognitive driving force underlying this transition was the externalization of memory. Whereas earlier humans had to depend entirely on their biology—that is, on their brains—to remember, modern humans can employ a huge number of powerful external symbolic devices to store and retrieve cultural knowledge. This revolutionized the way humans think and the kinds of distributed cognitive systems we could construct. Thus modern culture contains within it a trace of each of our previous stages of cognitive evolution. It still rests on the same old primate brain capacity for episodic or event knowledge. But it has three additional, uniquely human layers: a mimetic layer, an oral-linguistic layer, and an external-symbolic layer. The minds of individuals reflect these three ways of representing reality.

Source: Excerpted from Donald (2001, 201, 260–62).

Table C.6 Integrative levels of understanding (Kieran Egan).

Level	Characteristics	Representatives
1. Somatic	Pre-language-using human experience. Embodied kind of understanding. Distinctive human "take" on the world beyond mere animal perception. Understanding of social structure through mimetic acts like plays and rituals. Correspondence to Merlin Donald's level of mimetic culture.	Prelinguist human beings
2. Mythic	Development of spoken and grammatical language. Use of binary structuring and metaphor. Deployment of rhythm and rhyme. Narratives as access to knowledge of all kinds. Imaginative incorporation of the world rather than simply learning of facts. Images and fantasies closely tied to affects and emotions. Story-shaping of experiences and events.	Oral cultures, Homer
3. Romantic	Development of written language and literacy. Second symbol system of written numbers and the alphabet referring to first symbol system of oral words. Extended discursive writing and discrete kind of literate thinking. Development of systematic investigation, early rational form of inquiry, and reflexivity. Narratives organized into large and coherent accounts. Simple binary structures complexified. Exploration of reality by trying to grasp its limits and extremes. Rational drive to represent the world accurately but still in a nonscientific and untheoretic way.	Thales, Anaximander, Anaximenes, Herodotus, Hecataeus, the "Greek miracle," European romanticism
4. Philosophic	Sophisticated language and literacy. Systematic, abstract, and generalized thinking with universal ambition. Rational reassessment of traditional authorities. Theoretical discourse. Appeal to empirical principles and general laws. Openness to "possibility." Correspondence to Jean Piaget's level of formal operations.	Thucydides, Plato, Aristotle, Hippocrates, Descartes, Bacon, European renaissance, Western enlightenment and nineteenth-century positivism
5. Ironic	High degree of reflexiveness on language and consciousness. Epistemic skepticism. Ironic stance about self-refuting claims such as "All knowledge is socially constructed." Acknowledgment of multiple perspectives. Criticism on metanarratives.	Socrates, Jakob Burkhardt, Friedrich Nietzsche, Richard Rorty, Western postmodernism

Source: Excerpted from Egan (1997, 33–171).

Table C.7 Integrative levels of cultural consciousness (James W. Fowler).

Level	Period	Characteristics
1. Orthodox (synthetic-conventional)	Pre-Enlightenment	The *orthodox temper* exhibits many of the structural features of the *Synthetic-Conventional* stage of faith. It preserves many dimensions of consciousness that resemble pre-Enlightenment modes of thinking and experiencing. In terms of faith consciousness the orthodox temper adheres to an implicit, tacitly held ideology. To be sure, there are explicit formulas and slogans that express deep going value options. Orthodox adherents, however, likely do not have a critically reflective, conceptual grasp on the worldview they espouse taken as a whole. Emotion-laden images and symbols provide cue for reactions and judgments that have the power of instincts or the voice of conscience within. Authority for the formulation and defense of this largely tacit value system is left, for the orthodox, to the recognized leaders of religious or political groups, interpreters of sacred scriptures or traditions, or political leaders certified as being congruent with the canons of their orthodox group or tradition. Authority, therefore, is located external to the person, and is located in sacred texts, in the group, in the tradition, or in the group's authorized representatives. Reliance upon such authorities tends to be justified in *personal* terms: trust is grounded in personal qualities of authoritative persons. Relations with persons of other religious traditions, ethnic groups, or races tend to be personalized. Persons of the orthodox temper are likely to say: "Some of my best friends are …" (naming the particular out-group to which they are referring). The unexamined assumption seems to be that "because I enjoy personal and friendly relations with one or a few representatives of that group, I understand, accept, and could get along with *all* such persons." Such a position makes examining the questions of whether one holds personal or group prejudices unnecessary. It allows one to ignore issues of deep going differences regarding symbols, beliefs, worldview, and institutional culture between religious traditions. It also allows the generalization of negative stereotypes for entire groups, based upon difficult relationships with one or a few representatives of those groups. Because orthodox adherents base their emotive loyalties on unquestioned external sources of authority, they allow themselves to live and act out of a largely unexamined sense of the superiority of their religious tradition over those of others.

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Table C.7 Integrative levels of cultural consciousness (James W. Fowler).

Level	Period	Characteristics
2. Progressive (individual-reflexive)	Enlightenment	The *progressive temper* honors and preserves many of the procedural ideals introduced into Western societies through the impact of the Enlightenment of the eighteenth century. They keep alive the Enlightenment's suspicion of received traditions and its spirit of knowing by analytically breaking down the subject matter to be known into its constituent parts. Correlatively, the persons and groups best described as progressive exhibit many of the structural features of the *Individuative-Reflexive* stage of faith. They tend to place authority for making choices on matters of personal and political concern upon the experience, reflective judgment, and personal conscience of presumably rational individuals. Prizing the powers of objectivity made possible by the disciplined use of reason, they tend to give a kind of sovereign privilege to the critical and reflective deliberations of the individual. In terms of faith consciousness, progressive employ critical and reflective procedures for analyzing and making explicit the contents of ideological perspective of particular theological positions. In faith consciousness, progressives tend to be resistant to appeals to authority based upon unexamined traditional doctrine or to claims dependent primarily upon ecclesial authority for their validity. Progressives locate authority *within* the self. In their approaches to religion, progressives favor approaches to scripture and tradition that employ strategies such as *demythologization*. In such approaches, myths, parables, symbols, and allegories in scriptures or tradition are analyzed from the standpoint of the assumptions, experiences, and knowledge of educated moderns for the *meanings* they conserve and express. These meanings may be restated in *conceptual* formulations, thus yielding their existential wisdom in terms that are acceptable to modern consciousness, while stripping off the "husks" of premodern worldviews and prescientific superstitions. Progressives demand explicit formulations of truth claims and their justification.

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Table C.7 Integrative levels of cultural consciousness (James W. Fowler).

Level	Period	Characteristics
3. Postmodern (conjunctive)	Post-Enlightenment	Postmodern consciousness, explicitly and implicitly, is a consciousness populated with *systems* and *system awareness*. I am suggesting that structurally postmodern consciousness parallels the *Conjunctive* pattern of faith consciousness. The term *conjunctive* derives from Carl Jung's appropriation of Nicholas of Cusa's concept of the *coincidentia oppositorum*, the conjunction, the holding together in one frame, of opposites. In the case of postmodern consciousness there is the juxtaposition—the holding in one complex range of models—of multiple systems. My claim is that the construction of these postmodern multiple systemic forms of consciousness represents a practical necessity for reflective persons in our era and is happing, willy-nilly, whether we have adequate theories or awareness to account for these constructs or not. In postmodern faith consciousness there is a recognition that there are no "naked" facts, truths, or events. All knowing involves interpretation; interpretations contrast and overlap due to the differing perspectives of those who construct meanings from different vantage points in a system or systems. Multiple perspectives must be taken into account and coordinated—including paradoxical or opposing perspectives—if anything deserving the complex name "truth" is to be modeled and understood. Recognizing that myths and symbols from classic traditions often "hold" and bring into view this sort of truthful richness, postmodern consciousness in faith manifests a *second* or *willed naivité* (Ricoeur). Persons and groups in the postmodern pattern may well hold allegiances to particular religious traditions. They recognize that we have no alternative to embracing interpretations and traditions of interpretation and that the complexity of our situations and demands for knowing commend stances of epistemological humility toward the richness of classic traditions that have perennially been accorded revealed status. From this practical postmodern standpoint it makes sense to eschew *relativism*, while acknowledging *relativity*, and with it the necessity of commitment in the midst of an embraced pluralism of such perspectives.

Source: Excerpted from Fowler (1996, 165–66, 168–69, 174–75).

Table C.8 Integrative levels of spatial representation in pictorial arts (Suzi Gablik).

Level	Cognitive development	Spatial characteristics	Megaperiods of art history
1. Enactive mode	*Preoperational* The stage at which representations are characterized by static imagery and space is subjectively organized. Psychical and physical ideas are not yet dissociated.	*Topological relations* Distance between objects is based on their proximity to one another on a two-dimensional plane which only takes height and breadth into account. Absence of depth, no unified global space which conserves size and distance.	*Ancient and medieval* including Graeco-Byzantine, ancient Oriental, Egyptian, archaic Greek and early medieval.
2. Iconic mode	*Concrete-operational* The stage at which representation can arrange all spatial figures in coordinate systems. Representation is still attached to its perceptual content, however. The emergence of perspective as a formal logic, applicable to any content whatsoever, but still confined to empirical reality and to the concrete features of the perceptual world.	*Projective and Euclidean relations* based on the static viewpoint of a single observer. Separation of observer and world.	*The Renaissance*
3. Symbolic mode	*Formal-operational* The stage at which hypothetical-deductive, logico-mathematical and propositional systems emerge, constructed and manipulated as independent relational entities without reference to empirical reality.	*Indeterminate, atmospheric space* (late Monet, cubism, Rothko). Space as an all-over extension in which all points are equal status and are relative to each other. No dominance of volume over void (Pollock).	*The modern period* including late impressionism, cubism, formalism, serial art, art governed by logical systems and by propositional thinking.

Source: Gablik (1979, 43).

Table C.9 Integrative levels of education (Jennifer M. Gidley).

Level	Characteristics	Historical appearance	Examples
1. Preformal	Symbolic, image-based forms of expression; myths and stories	A *pre*-formal phase must be taken from the beginnings of early human culture. During this period, children were enculturated by their extended families, tribes and communities. This has been the case for the vast majority of the world's population until around two hundred years ago.	Community and family enculturation
2. Formal	Formal reasoning; modernist worldview	A *formal* phase of school education. Within this sketch of formal education are two sub-streams: elite schooling from at least 2,000 years ago and mass public schooling which began only two hundred years ago in Europe as a holistic initiative, but since the Industrial Revolution saw schools being modelled on factories.	Mass schooling (schools and universities)
3. Postformal	Multiple epistemologies; multiple perspectives	A *postformal* phase beginning in the 20th century. In parallel with the global spread of formal education, the third macro-phase—postformal—is emerging in which postformal pedagogies will ideally flourish throughout the 21st century.	Holistic, developmental, networked, innovative, global education

Source: Excerpted from Gidley (2016, 73–95).

Table C.10 Integrative levels of worldview (Jürgen Habermas).

Level	Characteristics	Type of explanation and justification
1. Magical-animistic	Apparently the magical-animistic representational world of paleolithic societies was very particularistic and not very coherent.	
2. Mythological-naive	*Sociomorphic (preoperational)* The ordering representations of mythology first made possible the construction of a complex of analogies in which all natural and social phenomena were interwoven and could be transformed into one another. This does not mean that the members of the group have formed a distinct consciousness of the normative reality of a society standing apart from objectivated nature—these two regions have not yet been clearly separated.	*Narrative* Mythology permits narrative explanations with the help of exemplary stories.
3. Mythological-developed	*Sociocentric-objectivistic (concrete-operational)* Only with the transition to societies organized around a state do mythological world views also take on the legitimation of structures of domination (which already presuppose the conventional stage of moralized law). Thus the naive attitude to myth must have changed that time. Within a more strongly differentiated temporal horizon, myth is distantiated to a tradition that stands out from the normative reality of society and from a partially objectivated nature. With persisting sociomorphic traits, these developed myths establish a unity in the manifold of appearances.	Developed myths establish a unity in the manifold of appearances.

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Table C.10 Integrative levels of worldview (Jürgen Habermas).

Level	Characteristics	Type of explanation and justification
4. Rationalized	*Universalistic (early formal-operational)* The further transition from archaic to developed civilizations is marked by a break with mythological thought. There arise cosmological world views, philosophies, and the higher religions, which replace the narrative explanations of mythological accounts with argumentative foundations. The traditions going back to the great founders are explicitly teachable knowledge that can be dogmatized, that is, professionally rationalized. Of course, the universalistic structures of world views have to be made compatible with the traditionalistic attitude toward the political order that predominates in the ancient empires. This is possible above all because the highest principles, to which all argumentation recurs, are themselves removed from argumentation and immunized against objection. In the ontological tradition of thought, this finality is guaranteed through the concept of the absolute (or of complete self-sufficiency).	*Deductive* Cosmological world views, philosophies, and higher religions already permit deductive explanations from first principles (the originary actions of myth having been transformed into "beginnings" of argumentation, beyond which one cannot go).
5. Reflexive	*(late formal-operational)* In the course of the establishment of universalistic forms of intercourse in the capitalist economy and in the modern state the attitude towards the Judaeo-Christian and Greek-ontological heritage was refracted in a subjectivistic direction (the Reformation and modern philosophy). The highest principles lost their unquestionable character; religious faith and the theoretical attitude became reflexive. The advance of the modern sciences and the development of moral-practical will-formation were no longer prejudiced by an order that—although grounded—was posited absolutely. For the first time, the universalistic potential already contained in the rationalized world views could be set free. The unity of the world could no longer be secured objectively, through hypostasizing unifying principles (God, Being, or Nature); henceforth it could be asserted only reflectively, through the unity of reason (or through a rational organization of the world, the actualization of reason). The unity of theoretical and practical reason then became the key problem for modern world interpretations, which lost their character *as* world views.	*Nomological* Modern science, finally, permits nomological explanations and practical justifications, with the help of revisable theories and constructions that are monitored against experience.

Source: Excerpted from Habermas (1979, 103–5).

Table C.11 Integrative levels of collective identity (Jürgen Habermas).

Level	Representatives	Characteristics
1.	Tribal societies	*Common ancestors (kinship)* In neolithic societies collective identity was secured through the fact that individuals traced their descent to the figure of a common ancestor and thus, in the framework of their mythological world-view, assured themselves of a common cosmogonic origin. On the other hand, the personal identity of the individual developed through identification with a tribal group, which was in turn perceived as part of a nature interpreted in interaction categories. As social reality was not yet clearly distinguished from natural identity, the boundaries of the social world merged into those of the world in general. Without clearly defined boundaries of the social system there was no natural or social environment in the strict sense; contracts with alien tribes were interpreted in accord with the familiar kinship connections. On the other hand, encounters with civilizations that (unlike alien tribes) could no longer be assimilated to their own world represented a danger for the collective identity of societies organized along kinship lines (independently of the real danger of colonial conquest).
2.	State societies	*Common territorial organization (empire, state)* The transition to societies organized through a state required the relativization of tribal identities and the construction of a more abstract identity that no longer based the membership of individuals on common descent but on belonging in common to a territorial organization. This took place first through identification with the figure of a ruler who could claim a close connection and privileged access to the mythological world views the integration of different tribal traditions was accomplished through a large-scale, syncretistic expansion of the world of the gods—a solution that proved to be rather unstable. For this reason, imperially developed civilizations had to secure their collective identity in a way that presupposed a break with mythological thought. The universalistic world interpretation of the great founders of religions and of the great philosophers grounded a commonality of conviction mediated through a teaching tradition and permitting only abstract objects of identification. Collective identity could now be secured only by way of doctrines with a universal claim. In highly stratified civilizations, the integrating power of the identity of the empire had to confirm itself precisely in unifying the evolutionarily nonsynchronous structures of consciousness of the country, the aristocracy, city tradesmen, priests, and officials, and in binding them to the same political order. A broad spectrum of belief attitudes toward the same tradition was permitted; what was for one something like a myth that could still be connected with magical practices was for others a tradition of faith, however supported by ritual. The dogmatic organization of doctrinal knowledge often displaced even the weight of tradition with the weight of arguments and replaced an attitude of faith based on the authority of a doctrine with a theoretical attitude. But this universalistic potential could not be released on a large scale if the particularity of domination and of the citizen's status, which was merely concealed by the empire's claim to universality, was to remain imperceptible and not lead to significant discrepancies.

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Table C.11 Integrative levels of collective identity (Jürgen Habermas).

Level	Representatives	Characteristics
3.	Modern societies	*World citizens (legality, morality, sovereignty)* Such discrepancies turned up again and again in the ancient empires; but only with the transition to the modern world did they become unavoidable. The capitalist principle of organization meant the differentiation of a depoliticized and market-regulated economic system. This domain of decentralized individual decisions was organized on universalistic principles in the framework of bourgois civil law. It was thereby supposed that the private, autonomous, legal subjects pursued their interests in this morally neutralized domain of intercourse in a purposive-rational manner, in accord with general maxims. From this conversion of the productive sphere to universalistic orientations there proceeded a strong structural compulsion for the development of personality structures that replaced conventional role identity with ego identity. In fact, emancipated members of bourgois society, whose conventional identity had been shattered, could know themselves as one with their fellow citizens in their character as (a) free and equal subjects of civil law (the citizen as private commodity owner), (b) morally free subjects (the citizen as private person), and (c) politically free subjects (the citizen as democratic citizen of the state).

Source: Excerpted from Habermas (1979, 111–14).

Table C.12 Integrative levels of moral and legal representations (Jürgen Habermas).

Level	Moral consciousness	Basic socio-cognitive concepts	Ethics	Law
1.	Preconventional	Particular expectations of behavior	Magical ethics	Revealed law
2.	Conventional	Norm	Ethics of the law	Traditional law
3.	Postconventional	Principle	Ethics of conviction and responsibility	Formal law

Source: Based on Habermas (1987, 175: Figure 26)

Table C.13 Integrative levels of understanding of validity spheres (Jürgen Habermas).

Level	Differentiation of validity spheres	Sacred domains of action		Profane domains of actions	
		Cultic practice	*Worldviews that steer practice*	*Communication*	*Purposive activity*
1.	Confusion of relations of validity and effectiveness: performative-instrumental attitude	*Archaic societies* Rite (institutionalization of social solidarity)	*Archaic societies* Myth		
2.	Differentiation between relations of validity and effectiveness: orientation to success vs. to mutual understanding	*Civilizations* Sacrament/prayer (institutionalization of paths to salvation and knowledge)	*Civilizations* Religious and metaphysical worldviews	*Archaic societies* Communicative action bound to particular contexts and with a holistic orientation to validity	*Archaic societies* Purposive activity as a task-oriented element of roles (utilization of technical innovations)
3.	Differentiation of specific validity claims at the level of action: objectivating vs. norm-conformative vs. expressive attitudes	*Early modern societies* Contemplative presentation of auratic art (institutionalization of the enjoyment of art)	*Early modern societies* Religious ethics of conviction, rational natural law, civil religion	*Civilizations* Normatively regulated communicative action with an argumentative handling of truth claims	*Civilizations* Purposive activity organized through legitimate power (utilization of specialized practical-professional knowledge
4.	Differentiation of specific validity claims at the level of discourse: communicative action vs. discourse			*Early modern societies* Normatively unbound communicative action with institutionalized criticism	*Early modern societies* Purposive activity as ethically neutral purposive-rational action (utilization of scientific technologies and strategies)

Source: Based on Habermas (1987, 192: Figure 28).

Table C.14 Integrative levels of organization (Frederic Laloux).

Level*	Characteristics	Key breakthroughs	Guiding metaphor	Current example
1. Red	Constant exercise of power by chief to keep troops in line. Fear is the glue of the organization. Highly reactive, short-term focus. Thrives in chaotic environments.	Division of labor Command authority	Wolf pack	Mafia Street gangs Tribal militias
2. Amber	Highly formal roles within a hierarchical pyramid. Top-down command and control (what and how). Stability valued above all through rigorous processes. Future is repetition of the past.	Formal roles Processes (long-term perspective)	Army	Catholic church Military Public school systems
3. Orange	Goal is to beat competition; achieve profit and growth. Innovation is the key to staying ahead. Management by objectives (command and control on what; freedom on how).	Innovation Accountability Meritocracy	Machine	Multinational companies Charter schools
4. Green	Within the classic pyramid structure, focus on culture and empowerment to achieve extraordinary employee motivation.	Empowerment Value-driven culture Stakeholder model	Family	Culture-driven organizations (e.g., Southwest Airlines, Ben & Jerry's)
5. Teal	Organization seen as a living entity with its own evolutionary purpose. Strategy emerges organically from the collective intelligence of self-managing employees.	Self-management Wholeness Evolutionary purpose	Living systems	(e.g., AES, BSO/Origin, Buurtzorg, ESZB, FAVI, Heiligenfeld, Holacracy)

Source: Based on Laloux (2014, 36, 56–58, 223).

* Color code adopted from Wilber (2006), M.K.

Table C.15 Integrative levels of cognition in anthropoid primates (Sue T. Parker and Michael L. McKinney).

Level		Macaca (macaques)	Hylobates (gibbons)	Pan troglodytes (chimpanzees)	*Homo habilis*	*Homo erectus*	*Homo sapiens* (archaic)	*Homo sapiens* (modern)
1. Sensorimotor	Early	+	+	+	+	+	+	+
	Late		+	+	+	+	+	+
2. Preoperations	Early			+	+	+	+	+
	Late				+	+	+	+
3. Concrete operations	Early					+	+	+
	Late						+	+
4. Formal operations								+

Source: Based on Parker and McKinney (1999, 270: Table 9-1).

Table C.16 Integrative levels of cognition and culture modified after Merlin Donald (Sue T. Parker and Michael L. McKinney).

Donald	Revision of Donald's level model	Representative
1. Episodic culture	1. Episodic culture	Monkeys
	2. Rudimentary symbolic capacities	Great apes
2. Mimetic culture	3. Mimetic culture	*Homo erectus*
3. Mythic culture	4. Mythic culture	*Homo sapiens*
4. Theoretic culture	5. Theoretic culture	Literate humans

Source: Excerpted from Parker and McKinney (1999, 275–76).

Table C.17 Integrative levels of consciousness (Wojciech Pisula).

Level	Short description	Quality/mechanism (added to the lower level)	Purpose/function (performed for the higher level)	Description of subjects
1. Nonconsciousness (nonconscious sensation)	*I sense, but I do not know that I sense.*	Ability to experience sensory stimuli and respond to them	Adaptive automatisms (taxes, tropisms)	All animals equipped with nervous system and sensory organs
2. Sensory awareness	*I know that I sense.* Ability to experience sensory stimuli perception	Ability to experience sensory stimuli perception	Basic mechanism for regulating organism's behavior with respect to external events and objects through locating source of stimulus	All vertebrates with mesencephalon (midbrain), which is the centre for sensory integration in ancient vertebrates
3. Sensory-affective awareness	*I know that I can feel and that sensations are aversive or pleasant.*	Ability to experience pain and emotions. Memorizing emotions (generation of acquired drives)	Basic mechanism for regulating organism's behaviour towards external events and objects by assigning them affective meaning (sign); avoidance of aversive events and desiring events arousing pleasant sensations	All vertebrates that have evolved structures responsible for emotional responses (e.g. amygdala), starting from fish
4. Self-awareness	*I know that I exist and that there is a boundary between me (my body, mind) and the environment.*	Ability to read one's own feelings and thoughts; experiencing oneself, one's body and mind as separate from the rest of the reality; establishing a representation of "Self" fairly stable temporally and situationally	Basic aspects of regulating behavior towards others within a community and in interspecies relations	Majority of human population, including children under 3 years of age; significant proportion of primates, cateceans, carnivorans, corvids and parrots; possibly a large number of animals so far not assessed in this respect

(continued)

Table C.17 Integrative levels of consciousness (Wojciech Pisula).

Level	Short description	Quality/mechanism (added to the lower level)	Purpose/function (performed for the higher level)	Description of subjects
5. Meta-consciousness I	*I know that others feel, want, (dis)like, stick "with" or fight other members of the group.*	Ability to read emotions, what another individual knows (sees), others' attitudes towards the subject and other interaction partners; ability to personally recognize individual interaction partners	Relations within a small social group; building alliances within the group; coherent in-group relations, maintaining group identity with regard to other groups	The majority of human population, including schoolchildren; some primates and cetaceans, elephants, some corvids and parrots
6. Meta-consciousness II	*I know that others also know and judge.*	Ability to construct mental representations of other actors' mental states (thoughts, judgments) and to assume their perspective (understand their intentions, state of knowledge, feelings)	Widely understood social relations; an individual capable of perspective taking, successfully regulates his social relations, fit to enter social contracts, predict how others will behave in changeable conditions	Those healthy adults who achieve fullness of mental development. It seems that attaining this level requires strong cultural training, rich vocabulary, fluency in verbalizing feelings and psychological states

Source: Based on Pisula (2016, 58: Table A1).

Table C.18 Integrative levels of cognition and culture modified after Merlin Donald (Colin Renfrew).

Donald	Revision of Donald's level model	Characteristics
1. Episodic	1. Episodic culture	Primate cognition
2. Mimetic	2. Mimetic culture	*Homo erectus* cognition
3. Mythic	3. Linguistic or mythic culture	*Homo sapiens* cognition
4. Theoretic	4. External symbolic storage	Employing symbolic material culture (characteristic of early agrarian societies with permanent settlements, monuments and valuables)
	5. Theoretic culture	Using sophisticated information retrieval systems for external symbolic storage, usually in the form of writing (frequently in urban societies)

Source: Excerpted from Renfrew (1998, 4).

Table C.19 Integrative levels of spatial thinking (Jürgen Renn).

Level	Characteristics
1. Naturally conditioned space	Naturally conditioned space in the sense of schemata of action based on the similar biological constitution of all humans and the fundamental similarities in their physical environments. These schemata of action are rooted in sensorimotor intelligence that allows for spatial inferences to be drawn in the context of practice and perception but are otherwise inaccessible to the actors.
2. Culturally shared space	Culturally shared space, which is still shaped by elementary mental models controlling the action and perception of "naturally conditioned space," such as the so-called permanent object and landmark models familiar from studies in developmental psychology. The first allows for the handling of bodies in our vicinity, while the second underlies cognitive skills, allowing for navigation through various environments. But now these mental structures are endowed with cultural meaning. Thus, culturally shared large-scale space is spanned not only by landmarks, places, regions, and their relations, but also by the meanings attached to these entities. Aspects of the natural and cultural environments, culturally conditioned practices, and language serve as external representation. Knowledge about the environment is explored and accumulated by societies over the course of many generations. The resulting immense cultural diversity is due to the fact that different knowledge systems and institutions may represent responses to the challenges of very different ecologies, but it is also due to the different evolutionary trajectories along which this exploration takes place.
3. Administratively controlled space	Administratively controlled space as it was conceived and practiced, for instance, in the ancient civilizations of Mesopotamia, Egypt, China, or India. The social control of space involved mental models of practical knowledge related to building activities, urban planning, surveying, and field measurement. They might be externally represented by buildings, models, instruments, measuring tools, graphical representations, or symbol systems, for example. In ancient societies, new forms of spatial knowledge emerged from exploring these tools, as well as by exploring the external representations employed in administrative practices. In this way, for the first time, units of length, area, and volume were integrated into metric systems spanning spaces of different scales, whereas no previous relation had existed, for example, between spatial dimensions in the bodily realm and the spatial dimensions of a journey. However, such integrations of different domains of spatial knowledge may have taken different forms in different cultures. They took place, in any case, within a niche shaped by the preexistence of first-order representations supporting historically specific regulatory structures of spatial thinking and allowing for their extension by exploring the potential inherent in these representations.

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Table C.19 Integrative levels of spatial thinking (Jürgen Renn).

Level	Characteristics
4. Higher-order concepts of space	Higher-order concepts of space as they are externally represented by written texts, possibly comprising diagrams, formalized language, and other symbol systems. Beginning in Mesopotamia and Egypt, and then more markedly in Greece and China, the division of societal labor generated a knowledge economy with new groups of actors and structures of social interaction such as schooling and disputation. Here, existing concepts of space and their representations could be further explored. Thinking about space was regulated, to begin with, by the first-order concepts of space emerging at the preceding stage and by their external representations. Reflecting on practices involving these external representations in turn gave rise to higher-order concepts of space as they are represented, for instance, in Euclid's Elements. Owing to the representation of this higher-order knowledge of space by written texts, a tradition could be picked up even centuries after it had last been actively pursued. Different evolutionary lines may be distinguished: Mathematical higher-order knowledge, in particular, resulted from reflection on practical spatial knowledge and the use of instruments. Philosophical higher-order knowledge resulted from reflection on the linguistic representations of intuitive spatial knowledge. Further explorations of second-order concepts of space and reflections on their results led to a proliferation of theories of space both in philosophy and geometry.
5. Empirically controlled spatial concepts and practices	And finally, empirically controlled spatial concepts and practices as they emerged in the multiplication of spaces of experience by political expansion, trade, exploration, and engineering. This expansion changed (as an "externalization") both the natural and social environments, as well as the world of symbolic and instrumental representations—a transformation that, in turn, triggered an "internalization" in the form of new regulative structures, both in the social and the cognitive realms. In early modern Europe, for instance, the accumulation of experiential knowledge took place in part within institutions specifically designed for the purpose of knowledge acquisition, such as academies or universities. Intellectually, the accumulating empirical knowledge was organized in integrative structures based on symbolic and formalistic languages: numerical coordinates, analytic geometry, calculus, and differential equations. These structures stabilized or brought about empirically controlled spatial concepts and practices that are highly counterintuitive, for instance, the knowledge that Earth has a spherical shape and land masses and water distributed all over it. The theoretical knowledge resulting from the expansion of experiential spaces also had repercussions on other layers of knowledge, as well as on regulatory structures of societal practice. An example is the impact of global, geographical coordinates on navigation techniques, in particular on deep-sea navigation. This last stage also comprises the emergence of new space and time concepts in the context of Einstein's theories of relativity.

Source: Based on Renn (2020, 335–37).

Table C.20 Integrative levels of organizational action-logics (William R. Torbert).

Level	Characteristics	Correlation to personal action-logics
1. Conception	*Dreams about creating a new organization* Dreams, visions, informal conversations about creating something new to fill need not now adequately addressed; interplay among multiple founders; working models, prototypes, related projects, or business plans developed. Critical issues: timeliness and mythic proportion of vision	*Impulsive* Multiple, distinctive impulses gradually resolve into characteristic approach (e.g., many fantasies into a particular dream for a new organization
2. Investment	*Spiritual, social network, and financial investments* Champions commit to creating organization; early relationship-building among future stakeholders; peer networks and parent institutions make spiritual, structural, financial commitments to nurture. Critical issues: authenticity and reliability of commitments; financial investment appropriately subordinated to structural and spiritual investments	*Opportunist* Dominant task: gain power (e.g., bike riding skill, capital) to have desired effects on outside world
3. Incorporation	*Products or services actually rendered* Products and services produced; recognizable physical setting, tasks, and roles delineated; goals and operating staff chosen. Critical issues: display of persistence in the face of threat; maintaining or recreating consistency between original dream and actual organizational arrangements	*Diplomat* Looking-glass self: understanding others' culture/expectations and molding own actions to succeed in their terms (e.g., a marketable product)
4. Experiments	*Alternative strategies and structures tested* Alternative administrative, production, selection, reward, financial, marketing, and political strategies practiced, tested in operation, and reformed in rapid succession. Critical issues: truly experimenting—taking disciplined stabs in the dark—rather than merely trying one or two preconceived alternatives; finding a viable, longer-lasting combination of strategy and structure for the following stage	*Expert* Intellectual mastery of outside-self systems such that actions equal experiments that generate new ways of doing business

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Table C.20 Integrative levels of organizational action-logics (William R. Torbert).

Level	Characteristics	Correlation to personal action-logics
5. Systematic productivity	*Single structure/strategy institutionalized* Attention legitimately focused only on systematic procedures for accomplishing the predefined task; standards, structures, roles taken for granted as given; marketability or political viability of product or service, as measured in quantifiable terms, the overriding criterion of success. Critical issue: whether organization remembers analogical concerns about congruity from mission through outcomes during this emphasis on deductive, pyramidal systems	*Achiever* Pragmatic triangulation among plan/theory, operation/implementation, and outcome/evaluation—single loop feedback acted on unsystematically but regularly
6. Social network	*Portfolio of distinctive organizational structures* Strategic or mission-focused alliances among portfolio of organizations, with strong value on maintaining distinctive traditions, craft-orientations, and relative financial autonomy. Critical issue: will organization regress or progress in economically adverse conditions	*Individualist* Experimental awareness that diverse assumptions may complement one another both for inquiry and for productivity
7. Collaborative inquiry	*Self-amending structure matches dream/mission* Explicit, shared reflection about corporate mission; open interpersonal relations with disclosure, support, and confrontation of apparent value differences; systematic personal and corporate performance appraisal on multiple indexes; creative resolution of paradoxes-inquiry/productivity, freedom/control, quality/quantity; interactive development of unique, self-amending structures appropriate for this particular organization at this particular historical moment; critical issues: will organization sustain collaborative inquiry as it grows through hiring, merger, or strategic alliances, or will it revert to conventional *Systematic Productivity*	*Strategist* Self-conscious mission/philosophy, sense of time/place, invites conversation among multiple voices and reframing of boundaries—double-loop feedback occasionally acted on

(continued)

Table C.20 Integrative levels of organizational action-logics (William R. Torbert).

Level	Characteristics	Correlation to personal action-logics
8. Community of inquiry	*Structure fails, spirit sustains wider community* Appreciation of continuing interplay of opposites: action/research, sex/politics, past/future, symbolic/diabolic, etc.; ongoing experimental and empirical research on relations among spiritual/intuitive *visioning*, theoretical/practical *strategizing*, timely *performing*, and assessing *outcomes* in the visible, external world; all fundamentalist, universal ideologies are challenged by the community's emphasis on peer-like mutuality among people of diverse backgrounds and on the humble, vulnerable practice of timely action inquiry; political friction among different paradigms/frames/action-logics within the organization and between the organization and the wider environment; *Collaborative Inquiry* structure fails because it does not meet the alchemical challenge of timely transformational, emancipatory, collective action; if timely transformational collective action is taken, shared purpose is revealed as sustaining and as generating multiple choices for action (and feedback on the consequences of such choices) from all participants; new experiences of time; his-story becomes my-story; interplay of time-bound needs, timeless archetypes, and timely creative inquiry	*Alchemist* Life/science equals a mind/matter, love/death/transformation praxis among others, cultivating interplay, re-attunement and continual triple-loop feedback

Source: Excerpted from Torbert (2003, 126–29, 195).

Table C.21 Integrative levels of spatial cognition in stone-tool technology (Thomas Wynn).

Level	Spatial concept	Lithic technology	Period
1. Preoperational	Pre-Euclidean spatial concepts; topological relations (e.g., proximity, surrounding, pair, sequential order)	*Chopper, scraper, knapper* The spatial concepts necessary to manufacture the Oldowan tools are really rather simple. No Euclidean concepts are necessary, only topological relations. Topology is the geometry of simple spatial relations such as proximity and surrounding. Although some topological concepts do require operational thinking, the concepts necessary for Oldowan tools do not. A chopper, for example, results from striking a flake from a platform supplied by a previous flake removal. In topological terms, this requires a concept of pair; one element placed immediately next to one preceding element. The position of only one preceding element, in this case a flake removal, needs to be taken into account. This is true even if many flakes are eventually removed. The paired nature of chopper knapping yields an irregular edge with no intentional overall morphology, a characteristic of many Oldowan artefacts. The geometry of a scraper is a bit more complex. Several flake removals must be placed in such a way that the result is a continuous sequence. To do this it is necessary to consider the position of not just the preceding flake removal but also ones that have gone before. The relevant topological concept is that of order. Both the pair and sequential order can be achieved by a process of trial and error, that is, one flake is struck off, the result checked and then another struck off until an acceptable tool has been made. The Oldowan knappers need not have had a relatively complete plan of action and need not have employed operational thinking.	Oldowan (1.9–1.7 million years ago)
2. Operational (concrete)	Euclidean spatial concepts; projective relations (e.g., bilateral symmetry, reversibility)	*Handaxe* The Acheulean artefacts were clearly manufactured according to operational concepts. The most revealing of the artefacts is the handaxe, a tool whose shape requires some rather sophisticated Euclidean and projective relationships. Most obvious is the symmetry. Piaget has argued that symmetry is never passively perceived (true symmetry is extremely rare in nature) but must be actively constructed by means of the operational relation of reversibility. Put simply, bilateral symmetry results from the reversal of a shape across an imaginary midline. The ability to perform such a task is not achieved until the operational stage because it requires the simultaneous conception of the shape and its inverse. Since the stone cannot be folded to provide a model for trial and error flaking, the inverse must be constructed in thought, and inversion in thought is, as we have seen, a characteristic of operational thinking.	Acheulean (1.5 million–300,000 years ago)
(propositional)		*No archaeological evidence (at least until the introduction of writing).*	Modern humans

Source: Excerpted from Wynn (1985, 36–41).

Appendix D Correlations of Models of Integrative Levels of Knowing

Table D.1 Correlation of models of Integrative Levels of Knowing (Michael H. Barnes).

Level	Barnes *Culture*	*Mode of expression*	*Content of belief*	*Cognitive style*	Piaget	Kitchener	Lonergan
1.	Primitive	*Simple folktale* Various origin stories and other lore interpret reality and life for people, along with a good collection of commonsense information about the world.	*Animism (tribal)* Belief in spirit beings of relatively human size and power	*Folktale-magical* Analogies with preoperational thought, though it includes concrete operational thinking	*Preoperational* Collects bits and pieces of information without organizing them into large or complex categories		
2.	Archaic	*Literacy* Some religious stories become much more complex, in the form of long mythic narratives, and religious beliefs are often more clearly distinct from everyday information.	*Polytheism (national)* Belief in spirit beings of such great power that they require worship	*Literate-mythical* Retains primitive style of thought, but literacy creates an overlay, makes people more adept at concrete operational skills of categorizing and comparing ideas, more apt to construct long, coherently organized narratives	*Concrete operational* Organizes ideas into larger and more complex categories, showing an ability to cross-index ideas or things in consistent ways	*Cognition* Concrete operational thought	*Commonsense* Learning practical facts of life; a person's social context as authority

(continued)

Table D.1 Correlation of models of Integrative Levels of Knowing (Michael H. Barnes).

Level	Barnes *Culture*	*Mode of expression*	*Content of belief*	*Cognitive style*	Piaget	Kitchener	Lonergan
3.	Classical or "axial"	*Logical* Folktales and mythic narratives remain popular but are now in competition or cooperation with a more abstract and universalizing form of thought.	*Universalizing* Belief in some single Ultimate Being or Condition or Power	*Systemic-theoretical* Reliance on systematically logical explanatory theories of universal scope	*Early formal- operational* Is able to devise hypothetical alternative ways of explaining the categories, and of testing those explanations for logical coherence with each other and with evidence.	*Metacognition* Practice of examining one's own ideas for their coherence and validity; ability to reflect on reflections, to think about thinking	*Theory* Rational analysis; concern to understand the logical coherence of ideas
4.	Empirical-critical	*Critical-symbolic* Highly self-conscious symbolic awareness that has resulted from self-critical awareness of modern philosophy and science	*Reflexive* Self-aware form of belief that treats all beliefs as human symbolic representations of whatever is taken to be the ultimate or basic Reality.	*Empirical-critical* Symbolic or existentialist approaches to theology	*Late formal- operational* Treats any systematically or logically derived conclusion with greater awareness of their conditional nature	*Epistemic cognition* Concern for methods of knowing; acknowledging the existence of various intrasystematic positions	*Method* Critical method

Source: Excerpted from Barnes (2000, 20–30, 48–58, 95, 224).

Table D.2 Correlation of models of Integrative Levels of Knowing (Robert N. Bellah).

Level	Bellah *Religious representation*	Donald *Human culture*
1.	Unitive	*Episodic* Earliest is episodic culture, in which humans, along with all higher mammals, learn to understand and respond to the immediate situation they are in.
2.	Enactive	*Mimetic* Then, perhaps beginning as early as 2 million years ago, came mimetic culture, the prelinguistic, but not necessarily prevocal, use of the body both to imaginatively enact events and to communicate with others through expressive gesture.
3.	Symbolic	*Mythic* Then, some 100,000 or more years ago, with the development of language as we know it, came mythic culture, which Donald describes as "a unified, collectively held system of explanatory and regulatory metaphors. The mind has expanded its reach beyond the episodic perceptions of events, beyond the mimetic reconstruction of episodes, to a comprehensive modeling of the entire human universe." Every aspect of life, he says, "is permeated by myth." Although myth gives a comprehensive understanding of life, it does so exclusively by the use of metaphor and narrative. Also, mythic culture until very late in its history was, except for drawings of various kinds, an exclusively oral culture.
4.	Conceptual	*Theoretic* Donald begins his description of theoretic culture negatively, telling us that it involved "a break with the dominance of spoken language and narrative styles of thought," but a break with dominance does not mean the abandonment of earlier forms of cognitive adaptation. Humans are still episodic, mimetic, and mythic creatures, although, as in earlier transitions, the emergence of a new form of cultural cognition eventually involves reorganization of the earlier forms. The key elements of theoretic culture developed gradually; they consisted in graphic invention, external memory, and theory construction.

Source: Excerpted from Bellah (2011, 118, 272–73).

Table D.3 Correlation of models of Integrative Levels of Knowing (Fredda Blanchard-Fields).

Level	Blanchard-Fields	Perry	Labouvie-Vief	Loevinger	King/Kitchener	Commons/Richards	Armon
1.	Dualistic absolutism. Interpretation of events not differentiated from event itself. Subjectivity disallowed in reasoning process.	Dualistic construction of reality. Conformity and authority determine the correct absolute answer.	*Intrasystematic* Formal realism characterizes thought. Logic is not differentiated from interpretation and is reflected in external strategy of self-regulation.	*Conformist* Dualistic conception of right vs. wrong. Conformity to social norms without question.	Belief in absolute and true reality not known to everyone, i.e., right versus wrong beliefs.	*Formal operations* Ordered relations of classes and relations.	*Affective mutuality* The absence of reference outside the self's immediate environment. Recognizes self and others, but not self vs. society.
2.	Perceived discrepancies denied or deemed inconsequential; therefore subjectivity still disallowed in analysis.	Multiplicity is perceived, but uncertainty is not accepted.			Information is divided into certain and uncertain knowledge. Uncertain knowledge is to be known at a future date.		
3.	Multiple outcomes recognized with strong reliance on "objective" facts. Interpretive discrepancies recognized, yet resolved in the search for objective facts.	Multiplicity is accepted, yet the search for absolute answers just deemed more difficult.		*Conformist-Conscientious* Multiple possibilities accepted with minimal complexity. Sees world globally.	The uncertainty of reality is acknowledged. Therefore truth is relegated to the discrepancies of the individual.	*Systematic operations* Fifth-order operations that represent the coordination of formal-operational properties.	

(continued)

Table D.3 Correlation of models of Integrative Levels of Knowing (Fredda Blanchard-Fields).

Level	Blanchard-Fields	Perry	Labouvie-Vief	Loevinger	King/Kitchener	Commons/Richards	Armon
4.	Clearly recognized interpretive discrepancies of events in terms of underlying "neutral" event structure. Subjectivity still subordinated under objectivity.	Complete emersion in multiplicity with absolutes simply intractable.			The belief that objective knowledge does not exist. Reality is simply a reflection of subjective interpretation.	*Metasystematic* Sixth-order operations across systems relating systems to systems, resulting in cognitions about multiple systems.	*Individuality* Recognizes two separate systems of self and society, yet unable to coordinate them.
5.	Each discrepant perspective seen as valid in its own right due to interpersonal and subjective factors. Subjectivity seen to subordinate objectivity.	Relativism, where authority has no fixed answer; therefore one must rely on a relativistic concept of reality.	*Intersystemic* Self is seen as interpreter. Self-regulation is subordinated under internal goals, intentions, motives, etc. Self and other are differentiated.	*Conscientious* Aware of mutuality and communicative responsibilities. Differentiates self and others.	Given that reality is a matter of subjective interpretation, rational justification procedures are needed to form judgments.	*Cross-paradigmatic* Seventh-order operations that relate families, systems, or systems of systems.	*Autonomy* Recognizes need for coordination of self and society. e.g., that which is potentially opposed or contradictory.

(continued)

Table D.3 Correlation of models of Integrative Levels of Knowing (Fredda Blanchard-Fields).

Level	Blanchard-Fields	Perry	Labouvie-Vief	Loevinger	King/Kitchener	Commons/Richards	Armon
6.	Self as interpreter is explicitly stated. Self and external sources are well differentiated. Interpretive discrepancies resolved by relating both to self and to other.	Commitment within relativism where a choice is made within a relative world based on personal "fit."	*Autonomous* Conflicts between self and other are resolved by reflected transformations and reciprocal processes.	*Conscientious to Autonomous* Psychological causality is completely incorporated in analysis. Differentiates process from product and attempts to integrate polarities in life.	Given subjective interpretations of reality, a synthesis can be reached that is epistemically justifiable.		*Universal holism* External social self system and internal self system are fully coordinated as subsystems of a greater system.

Source: Based on Blanchard-Fields (1989, 76–78: Table 4.1).

Table D.4. Correlation of models of Integrative Levels of Knowing (Susanne R. Cook-Greuter).

Cook-Greuter		Loevinger	Torbert	Commons/Richards	Beck/Cowan	Wilber
1st person perspective	Impulsive	Impulsive	Impulsive	Nominal actions	Beige	Magenta
	Self-protective/ opportunist	Self-protective	Opportunist	Preoperational actions	Purple	Red
2nd person perspective	Rule-oriented			Primary actions	Red	
	Conformist	Conformist	Diplomat	Concrete operations	Blue	Amber
3rd person perspective	Self-aware	Self-aware	Expert	Abstract operations		
	Conscientious	Conscientious	Achiever	Formal operations	Orange	Orange
4th person perspective	Pluralist/ individualist	Individualistic	Individualist	Systematic operations	Green	Green
	Autonomous	Autonomous	Strategist	Metasystematic operations	Yellow	Teal
5th person perspective	Construct-aware	Integrated	Alchemist	Paradigmatic operations	Turquoise	Turquoise
	Ego aware		Magician			
	Unitive		Ironist			Indigo

Source: Based on Cook-Greuter (1990, 104; 2010, 230–31).

Table D.5 Correlation of models of Integrative Levels of Knowing (Jennifer M. Gidley).

Level	Piaget *Cognition*	Kegan *Thinking*	Kohlberg *Moral*	Gidley *Education*	Egan *Understanding*	Gebser *Worldview*	Wilber *Consciousness*
1.	Sensori-motor	Impulsive	Pre-conventional	Preformal	Somatic	Archaic	Arachaic-uroboic
2.	Pre-operational	Instrumental			Mythic	Magical	Magic-typhonic
3.	Concrete operations	Socialized			Romantic	Mythic	Myth-membership
4.	Formal operations	Self-authoring	Conventional	Formal	Philosophic	Mental	Ego-rational
5.	Postformal reasoning	Self-transforming	Post-conventional	Postformal	Ironic	Integral	Vision-logic

Source: Excerpted from Gidley (2016, 26, 104, 162, 214: Tables 2.1, 5.2, 7.1, 9.3).

Table D.6 Correlation of models of Integrative Levels of Knowing (Jürgen Habermas).

Level	Loevinger				Kohlberg	
	Ego stage	*Impulse control*	*Interpersonal style*	*Conscious preoccupation*	*Moral stage*	*Characteristics*
1.	Presocial		Autistic			
2.	Symbiotic		Symbiotic	Self vs. nonself		
3.	Impulse ridden	Impulse ridden, fear of retaliation	Exploitive, dependent	Bodily feelings, especially sexual and aggressive	Obedience and punishment	*Preconventional* Egocentric deference to superior power or prestige, or trouble-avoiding set. Objective responsibility.
4.	Opportunistic	Expedient, fear of being caught	Exploitive, manipulative, zero-sum-game	Advantage, control	Instrumental hedonism	Right action is that instrumentally satisfying the self's needs and occasionally those of others. Naive egalitarianism and orientation to exchange and reciprocity.
5.	Conformist	Conformity to external rules, shame	Reciprocal, superficial	Things, appearance, reputation	Good-boy orientation	*Conventional* Orientation to approval and to pleasing and helping others. Conformity to stereotypical images of majority or natural role behavior, and judgment by intentions.
6.					Law-and-order orientation	Orientation toward authority, fixed rules, and the maintenance of the social order. Right behavior consists of doing one's duty, showing respect for authority, and maintaining the given social order for its own sake.

(continued)

Table D.6 Correlation of models of Integrative Levels of Knowing (Jürgen Habermas).

Level	Loevinger				Kohlberg	
	Ego stage	*Impulse control*	*Interpersonal style*	*Conscious preoccupation*	*Moral stage*	*Characteristics*
7.	Conscientious	Internalized rules, guilt	Intensive, responsible	Differentiated inner feelings, achievements, traits	Contractual-legalistic orientation	*Postconventional* Right action is defined in terms of individual rights and of standards which have been initially examined and agreed upon by the whole society. Concern with establishing and maintaining individual rights, equality, and liberty. Distinctions are made between values having universal, prescriptive applicability and values specific to a given society.
8.	Autonomous	Coping with inner conflict, toleration of differences	Intensive concern for autonomy	Ditto, role conceptualization, development, self-fulfillment	Universal-ethical principle orientation	Right is defined by the decision of conscience in accord with self-chosen ethical principles appealing to logical comprehensiveness, universality, and consistency. These principles are abstract; they are not concrete moral rules. These are universal principles of justice, of the reciprocity and equality of human rights, and of respect for the dignity of human beings as individual persons.
9.	Integrated	Reconciling inner conflicts, renunciation of unattainable	Ditto, cherishing of individuality	Ditto, identity		

Source: Based on Habermas (1979, 76–77: Schemes 1, 1a).

Table D.7 Correlation of models of Integrative Levels of Knowing (Sue T. Parker and Michael L. McKinney).

Level	Parker/McKinney	Mithen	Donald	Representative
1.	Apprenticeship (symbolic)	*General intelligence* Powerful general intelligence plus several specialized mental modules, including one for social intelligence (which first evolved in monkeys)	Episodic culture	Great apes
2.	Joint attention (early concrete operational)	*Multiple specialized intelligences* Language module communicated with the social module, but remained isolated from the technological and natural history modules, which also remained isolated from each other	Mimetic culture	Homo erectines
3.	Declarative planning (late concrete operational)	*Flexible flow of knowledge among the multiple intelligences* Barriers among the modules break down, resulting in flexible, general purpose intelligence	Mythic culture	*Homo sapiens*
4.	(formal operational)		Theoretic culture	

Source: Excerpted from Parker and McKinney (1999, 275–77, 286–87).

Table D.8 Correlation of models of Integrative Levels of Knowing (Angela H. Pfaffenberger and Paul W. Marko).

Level	Hy/Loevinger	Cook-Greuter	Torbert	Joiner
1.	Impulsive	Impulsive	Impulsive	Enthusiast
2.	Self-protective	Self-protective	Opportunist	Operator
3.	Conformist	Conformist	Diplomat	Conformer
4.	Self-aware	Self-aware	Expert	Expert
5.	Conscientious	Conscientious	Achiever	Achiever
6.	Individualist	Individualist	Individualist	Catalyst
7.	Autonomous	Autonomous	Strategist	Co-Creator
8.	Integrated	Construct Aware	Alchemist	Synergist
9.		Unitive	Ironist	

Source: Based on Pfaffenberger and Marko (2011, 3: Table I.1).

Table D.9 Correlation of models of Integrative Levels of Knowing (Philip M. Powell).

Level	Piaget	Selman	Fischer	Commons/Richards
1.	Sensori-motor		Ability to form sets of concrete actions on and perceptions of things	Circular sensori-motor actions and sensori-motor actions
2.	Preoperations	Egocentric perspective-taking		Nominal actions and preoperations
3.	Preoperations and early concrete operations	Subjective perspective-taking	Developing ability to represent concrete attributes of an object	Preoperations and primary operations
4.	Advanced concrete operations	Reciprocal perspective-taking	Developing ability to relate one representational set to another	Concrete operations
5.	Early formal operations	Mutual perspective-taking	Ability to relate two representational systems to solve simple formal operations tasks	Abstract operations
6.	Formal operations	Societal-symbolic perspective-taking	Early ability to relate one abstract concept to another	Formal operations
7.			Ability to integrate within and across two or more abstract systems	Systematic or metasystematic operations
8.			Ability to integrate subject and object	Metasystematic through cross-paradigmatic operations

Source: Based on Powell (1984, 337–38: Table 15.2).

Table D.10 Correlation of models of Integrative Levels of Knowing (John Snarey, Lawrence Kohlberg, and Gil Naom) – Part 1.

Level	Period	Ego development			Epistemological reasoning		
		Erikson	Loevinger	Kegan	Piaget	Selman	Perry
1.	Infancy	Hope	Presocial, autistic	Incorporative	Sensorimotor		
		Will					
2.	Early childhood	Purpose	Symbiotic	Impulsive	Preoperational	Egocentric	Simple dualism
3.	Middle childhood	Competence	Impulsive	Imperial	Concrete operations	Subjective	
4.	Late childhood		Self-protective			Self-reflective	Dualism
5.	Early adolescence	Fidelity	Conformist	Interpersonal	Formal operations	Mutual	Subordinate multiplicity
6.	Later adolescence		Conscientious	Institutional		Systems	Multiplicity | Relativism
7.	Early adulthood	Love	Autonomous	Interindividual		Symbolic	Commitment
8.	Middle adulthood	Care	Integrated		[Postformal operations]		
9.	Maturity	Wisdom					

Source: Snarey, Kohlberg and Noam (1983, 331: Table 3).

Table D.11 Correlation of models of Integrative Levels of Knowing (John Snarey, Lawrence Kohlberg, and Gil Naom) – Part 2.

Level	Period	Moral reasoning			Metaphysical reasoning	
		Snarey *Natural environment*	Kohlberg *Social environment*	Oser *Ultimate environment*	Broughton *Natural and social environment*	Fowler *Ultimate environment*
1.	Infancy	Amoral protoplasmic	Amoral egocentrism		Undifferentiated	Primal
2.	Early childhood	Animal attraction and avoidance	Obedience-punishment	Complete determinism	Objective	Intuitive-projective
3.	Middle childhood				Individual	Mythic-literal
4.	Late childhood	Natural reciprocity	Hedonism, concrete reciprocity	Instrumental reciprocity with deity		
5.	Early adolescence	Animal lover or friend of animals	Interpersonal accord, conformity	Voluntarism	Divided	Conventional
6.	Later adolescence	The natural system, ecological perspective	Social accord and system maintenance	Divine plan	Dualist	Individuating and reflexive
7.	Early adulthood	Animal rights	Social contract	Intersubjectivity, God as liberator	Subjective	
					Rational	
8.	Middle adulthood	Universal oneness with nature	Universal ethical principles	Universal communion	Dialectical materialist	Paradoxical-consolidative
9.	Maturity					Universalizing

Source: Snarey, Kohlberg and Noam (1983, 332: Table 3).

Table D.12 Correlation of models of Integrative Levels of Knowing (Zachary Stein and Katie Heikkinen).

Level	Fischer	Commons	Kohlberg	Armon	King/Kitchener	Kegan	Beck	Cook-Greuter
0.	Single reflexes	Calculatory						
1.	Reflexive mappings	Sensory or motor						
2.	Reflexive systems	Circular sensory motor						
3.	Single sensorimotor actions	Sensory-motor						
4.	Sensorimotor mappings	Nominal						
5.	Sensorimotor systems	Sentential						
6.	Single representations	Pre-operational	Stage 1	Stage 1		Impulsive		1st person
7.	Representational mappings	Primary		Stage 2			Magical-animistic	2nd person
8.	Representational systems	Concrete	Stage 2			Imperial	Power gods	
9.	Single abstractions			Stage 3			Absolutist	3rd person
10.	Abstract mappings	Formal	Stage 3		Stage 3	Interpersonal	Individualistic achiever	
11.	Abstract systems	Systemic	Stage 4	Stage 4	Stage 4	Institutional	Relativistic	4th person
12.	Single principles	Metasystemic	Stage 5	Stage 5	Stage 5	Interindividual	Systemic-integrative	5th person

(continued)

Table D.12 Correlation of models of Integrative Levels of Knowing (Zachary Stein and Katie Heikkinen).

Level	Fischer	Commons	Kohlberg	Armon	King/Kitchener	Kegan	Beck	Cook-Greuter
13.	Principled mappings	Paradigmatic	Stage 6		Stage 6 | Stage 7		Global holistic	Global
14.	Principled systems	Cross-paradigmatic					Coral	Cosmic

Source: Based on Stein and Heikkinen (2008, 123: Table 2).

Table D.13 Correlation of models of Integrative Levels of Knowing (Fred Travis and Sue Brown).

Level	Age (years)	Brain maturation	Piaget *Cognitive stage*	Alexander *Predominant process of knowing*	Loevinger (Cook-Greuter) *Ego stage*	
1.	0–2	Neural exuberance and myelination of sensory and motor areas	Sensorimotor	Behavior senses	Presocial	Preconventional
					Symbiotic	
2.	2–7	Maximum number of connections	Preoperations	Desire	Impulsive	
3.	7–11	Corpus callosum myelinates and pruning begins around age 10	Concrete operations	Mind	Self-protective	
4.	11–18	Prefrontal connections begin to myelinate at age 12, and pruning finishes at age 18	Formal operations	Intellect	Conformist	Conventional
					Self-aware	
					Conscientious	
5.	18–25	Prefrontal myelination finishes		Feeling and intuition	Individualistic	Postconventional
6.		Experience continues to shape brain circuits throughout one's life span	Postformal operations	Individual ego	Integrative (Construct-aware | Unitive)	
7.	25+	Techniques such as meditation practices are needed to promote postsymbolic experiences		Universal ego	Higher states of consciousness	

Source: Based on Travis and Brown (2011, 29: Table 2.1).

Table D.14 Correlation of models of Integrative Levels of Knowing (Charu T. Tuladhar and Michael L. Commons).

Level	Commons et al. *Order of hierarchical complexity*	Fischer/Bidell *Cognition*	Piaget/Inhelder *Cognition*	Colby/Kohlberg *Moral*	
1.	Calculatory				
2.	Automatic				
3.	Sensory or motor				
4.	Circular sensory motor	Single sensory-motor set	Sensorimotor		
5.	Sensory motor	Sensory-motor mapping			
6.	Nominal	Sensory-motor system	Preoperational	Stage 1	Preconventional
7.	Sentential				
8.	Preoperational	Single representational set			
9.	Primary	Representational mapping		Stage 2	
10.	Concrete	Representational system	Concrete operational		
11.	Abstract	Single abstract set		Stage 3	Conventional
12.	Formal	Abstract mappings	Formal operational		
13.	Systematic	Abstract systems		Stage 4	

(continued)

Table D.14 Correlation of models of Integrative Levels of Knowing (Charu T. Tuladhar and Michael L. Commons).

Level	Commons et al. *Order of hierarchical complexity*	Fischer/Bidell *Cognition*	Piaget/Inhelder *Cognition*	Colby/Kohlberg *Moral*	
14.	Metasystematic	Single principles	[Postformal]	Stage 5	Postconventional
15.	Paradigmatic			Stage 6	
16.	Cross-paradigmatic				
17.	Meta-paradigmatic				

Source: Based on Tuladhar and Commons (2014, 26: Table 1).

Table D.15 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 1.

Level	Wilber *Basic structure*		*General self-sense*	*Specific aspects*	*Defenses*	*Possible pathology*	*Treatment*	*Fulcrum*
1.	Sensori-motor	Matter	Material self	Pleromatic	Distortion, delusional projection, hallucination, wish fulfillment	Psychosis	Intense regressive therapies, pacification	F1 (physical self)
2.		Sensation	Bodyego	Uroboic				
3.		Perception						
4.		Exocept		Axial-body				
5.	Phantasmic-emotional	Impulse		Pranic-body (typhonic)	Selfobject fusion, projection, splitting	Borderline	Structure-building	F2 (emotional self)
6.		Image		Image-body (magical)				
7.	Representational	Symbol	Persona	Name-self	Isolation, repression, reaction form	Neurosis	Uncovering	F3 (self-concept)
8.		Endocept						
9.		Concept		Concept-self				
10.	Concrete-operational	Rule/role		Membership-self (mythic)	Displacement, duplicitous transactions, covert intentions	Script	Script analysis	F4 (role self)
11.								
12.	Formal-operational	Formal	Ego	Mature ego	Suppression, anticipation, sublimation	Ego	Introspection	F5 (mature ego)
13.								

(continued)

Table D.15 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 1.

Level	Wilber *Basic structure*		*General self-sense*	*Specific aspects*	*Defenses*	*Possible pathology*	*Treatment*	*Fulcrum*
14.	Postformal	Vision-logic	Centaur	Centaur (existential, integrated self)	Inauthenticity, deadening, aborted self-actualization, bad faith	Existential	Existential therapy	F6 (centaur)
15.								
16.								
17.	Transpersonal	Psychic	Soul	Psychic self	Psychic inflation, split-life goals, pranic disorder, yogic illness	Psychic	Path of yogis	F7 (psychic)
18.								
19.		Subtle		Subtle self (soul)	Failed integration, archetypal fragmentation	Subtle	Path of saints	F8 (subtle)
20.								
21.		Causal	Spirit	Pure Self (Witness)	Failed differentiation, Arhat's disease	Causal	Path of sages	F9 (causal)
22.								
23.		Nondual		Nondual				Ground

Source: Based on Wilber (1999, 627: Chart 1A).

Table D.16 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 2.

Level	Wilber *Basic structure*		*Worldview* *(name)*	*(general characteristics)*	
1.	Sensori-motor	Matter	Archaic	Undifferentiated, pleromatic	Egocentric
2.		Sensation			
3.		Perception			
4.		Exocept	Archaic-magical	Hallucinatory wish fulfillment, subject-object fusions, “selfobject”	
5.	Phantasmic-emotional	Impulse			
6.		Image	Magical	Egocentric, word magic, narcissistic; locus of magic power = ego	
7.	Representational	Symbol			
8.		Endocept	Magic-mythic	Omnipotence of ego challenged; security; ego omnipotence transferred to gods	
9.		Concept	Mythic (literal)	Concrete-literal myths; locus of magic power = deified Other	
10.	Concrete-operational	Rule/role	Mythic-rational	Rationalization of mythic structures; demythologizing; formalizing	Ethnocentric
11.					
12.	Formal-operational	Formal	Rational formalism	Static universal formalism	
13.				Static systems/contexts	

(continued)

Table D.16 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 2.

Level	Wilber *Basic structure*		*Worldview* *(name)*	*(general characteristics)*	
14.	Postformal	Vision-logic	Pluralistic relativism	Pluralistic systems, dynamic-multiple contexts/histories	Worldcentric
15.			Holistic integralism	Integrates multiple contexts; paradigmatic	
16.				Cross-paradigmatic; dialectical developmentalism as World Process	
17.	Transpersonal	Psychic	Psychic (shamanic, yogic)	Union with World Process; nature mysticism; gross real unity	Theocentric
18.					
19.		Subtle	Subtle (archetypal, saintly)	Union with creatrix of gross realm; deity mysticism; subtle realm unity	
20.					
21.		Causal	Causal (formless, sage)	Union with source of manifest realms; formless mysticism; causal unity	
22.					
23.		Nondual	Nondual (siddha)	Union of form and formless; Spirit and World Process; nondual mysticism	

Source: Based on Wilber (1999, 628: Chart 1B).

Table D.17 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 3.

Level	Wilber *Basic structure*		*Moral span* *(those deemed worthy of moral consideration)*		*Affect*	*Gender identity*	*Art*
1.	Sensori-motor	Matter	"me" (locus of bodily self)	Preconventional (egocentric)	Reactivity	Morphological-genetic givens	
2.		Sensation			Sensations		Sensorimotor (initial aesthetic impact)
3.		Perception			Physiostates (touch, temperature, pleasure, pain)	Undifferentiated	
4.		Exocept					
5.	Phantasmic-emotional	Impulse			Protoemotions (tension, fear, rage, satisfaction)	Differentiated basic-gender identity	Emotional-expressivist (feeling-expression)
6.		Image					
7.	Representational	Symbol					Magical imagery (e.g., Paleolithic cave art, dream imagery)
8.		Endocept			2nd degree emotions (anxiety, anger, wishing, liking, safety)		
9.		Concept					
10.	Concrete-operational	Rule/role			3rd degree emotions (love, joy, depression, hate)	Gender conventionality	Mythological-literal (e.g., concrete religious art, icons)
11.			"us" (locus of mythic membership: family, group, tribe, nation)	Conventional (sociocentric)		Gender consistency (norms)	
12.	Formal-operational	Formal			4th degree emotions (universal affect, global justice, care,		Perspectival (e.g., naturalistic, empirical-representational, impressionist,
13.							

(continued)

Table D.17 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 3.

Level	Wilber *Basic structure*		*Moral span* *(those deemed worthy of moral consideration)*		*Affect*	*Gender identity*	*Art*
14.	Postformal	Vision-logic	"all of us" (locus of rational universal pluralism: all humans without exception)	Postconventional (worldcentric)	compassion, all-human love, worldcentric altruism)	Gender androgyny (transdifferentiated)	conceptual, formal)
15.							Aperspectival (e.g., cubist, abstract)
16.							
17.	Transpersonal	Psychic	"all earthly beings" (locus of World Soul)	Post-postconventional (shamanic)	Awe, rapture, all-species love, compassion		Symbolist (e.g., fantastic realist, psychic perceptual)
18.							
19.		Subtle	"all sentient beings" (locus of Brahma-lokas)	(boddhisattvic)	Ananda, ecstasy, love-bliss, saintly commitment	Archetypal gender-union (tantra)	Archetypal (e.g., thangka, bhakti expressivist)
20.							
21.		Causal			Infinite freedom, release, boddhisattvic compassion	Beyond gender	
22.							Non-dual (e.g., Zen landscape)
23.		Nondual	"all manifest and unmanifest"	(Buddhic)	One taste		

Source: Based on Wilber (1999, 627–28, 643: Charts 1-B, 8).

Table D.18 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 4.

Level	Wilber *Basic structure*		Habermas *Sociocultural evolution*	*Individual's identity*	*Level of communication*	*Idea of the good life*	*Ethics*
1.	Sensori-motor	Matter					
2.		Sensation					
3.		Perception					
4.		Exocept					
5.	Phantasmic-emotional	Impulse	Archaic (familization of male)				
6.		Image					
7.	Representational	Symbol	Magical-animistic (tribal kinship, preconventional law)	Natural identity	Actions and consequences of action	Hedonism under obedience	
8.		Endocept					
9.		Concept				Hedonism under exchange	Naive hedonism
10.	Concrete-operational	Rule/role	Mythological (early state, conventional law)	Role identity	Roles	Concrete morality/primary groups	
11.					Systems of norms	Concrete morality/secondary groups	Specific order
12.	Formal-operational	Formal	Mythic-rational (empire)	Ego identity	Principles	Civil liberties, legal freedom	Rational natural law
13.			Rational-reflective (nation			Moral freedom	Formalistic ethics

(continued)

Table D.18 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 4.

Level	Wilber *Basic structure*		Habermas *Sociocultural evolution*	*Individual's identity*	*Level of communication*	*Idea of the good life*	*Ethics*
14.	Postformal	Vision-logic	state, postconventional law)				
15.			World citizen (global)			Political freedom	Universal ethics of speech
16.							
17.	Transpersonal	Psychic					
18.							
19.		Subtle					
20.							
21.		Causal					
22.							
23.		Nondual					

Source: Based on Wilber (1999, 644, 646: Charts 9A, 10).

Table D.19 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 5.

Level	Wilber *Basic structure*		Piaget *Cognition*		Commons/Richards *Cognition*	Fischer *Cognition*	Alexander *Cognition*
1.	Sensori-motor	Matter					
2.		Sensation					
3.		Perception	Sensorimotor		Sensorimotor actions	Single sensorimotor set	Sensorimotor
4.		Exocept			Sentential actions	Sensorimotor mapping	
5.	Phantasmic-emotional	Impulse				Sensorimotor system	Prana-emotion-desire
6.		Image	Preoperational (preconceptual)				
7.	Representational	Symbol			Nominal actions	Single representational set	
8.		Endocept	(conceptual, intuitive)		Preoperational actions		
9.		Concept				Representational mapping	Representational mind
10.	Concrete-operational	Rule/role	Concrete-operational	Substage 1	Primary actions	Representational system	
11.				Substage 2	Concrete operations	Abstract set	
12.	Formal-operational	Formal	Formal-operational	Substages 1 | 2	Abstract | Formal operations	Abstract mapping	
13.				Substage 3	Systematic	Systems	Abstract mind

(continued)

Table D.19 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 5.

Level	Wilber *Basic structure*		Piaget *Cognition*	Commons/Richards *Cognition*	Fischer *Cognition*	Alexander *Cognition*
14.	Postformal	Vision-logic	Polyvalent logic (systems of systems)	Metasystematic	Systems of systems	
15.				Paradigmatic		
16.				Cross-paradigmatic		
17.	Transpersonal	Psychic				
18.						
19.		Subtle				Transcendental intuition
20.						
21.		Causal				Root mind
22.						Pure Self
23.		Nondual				Brahman-Atman

Source: Based on Wilber (1999, 631: Chart 3A).

Table D.20 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 6.

Level	Wilber *Basic structure*		Loevinger *Ego*	Cook-Greuter *Self-sense*	*(characteristics)*	*(perspective)*
1.	Sensori-motor	Matter				
2.		Sensation				
3.		Perception	Presocial (autistic)	Presocial	Autistic, undifferentiated	
4.		Exocept				
5.	Phantasmic-emotional	Impulse	Symbiotic	Symbiotic	Confused, confounded	
6.		Image				
7.	Representational	Symbol		Impulsive	Rudimentary self-labeling	1st person
8.		Endocept				
9.		Concept	Self-protective	Self-protective	Basic dichotomies, concepts	
10.	Concrete-operational	Rule/role		Rule-oriented	Early roles	2nd person
11.			Conformist	Conformist	Simple roles	3rd person
12.	Formal-operational	Formal	Conscientious-conformist	Self-conscious	Introspection	
13.			Conscientious | Individualistic	Conscientious | Individualistic	Historical self, many roles | Relativity of self	4th person

(continued)

Table D.20 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 6.

Level	Wilber *Basic structure*		Loevinger *Ego*	Cook-Greuter *Self-sense*	*(characteristics)*	*(perspective)*
14.	Postformal	Vision-logic	Autonomous	Autonomous	Self as system	
15.			Integrated	Ego-witnessing	Self as construct	5th person
16.				Construct-witnessing	Self transparent	6th person
17.	Transpersonal	Psychic		Universal	Ego transcendence	
18.				Cosmic		
19.		Subtle				
20.						
21.		Causal				
22.						
23.		Nondual				

Source: Based on Wilber (1999, 633, 635: Charts 4A, 4C).

Table D.21 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 7.

Level	Wilber *Basic structure*		Erikson *Ego*	Maslow *Needs*	Neumann *Mythological*	*Psychological*
1.	Sensori-motor	Matter		Physiological	Pleroma	Pleromatic, uroboic fusion
2.		Sensation	Trust vs. mistrust		Uroboros	Alimentary uroboros
3.		Perception				Uroboric Mother
4.		Exocept				Wish-fulfillment, magic
5.	Phantasmic-emotional	Impulse	Autonomy vs. shame and doubt	Beginning of safety	The Great Mother	Material incest
6.		Image				Bodyself, narcissism
7.	Representational	Symbol			Separation of the World Parents	Oedipus, Elektra
8.		Endocept		Safety		
9.		Concept	Initiative vs. guilt and anxiety		Dragon fight, birth of the Hero	Overcoming instincts
10.	Concrete-operational	Rule/role			Slaying of Mother	Emergence of ego
11.			Industry vs. inferiority	Belongingness		Differentiation of anima
12.	Formal-operational	Formal		Self-esteem	Slaying of Father	Differentiation of animus
13.			Identity vs. role confusion		Captive and Treasure	Mature ego

(continued)

Table D.21 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 7.

Level	Wilber *Basic structure*		Erikson *Ego*	Maslow *Needs*	Neumann *Mythological*	*Psychological*
14.	Postformal	Vision-logic	Intimacy vs. isolation	Self-actualization	Transformation	Ego/self integration
15.			Generativity vs. stagnation			
16.			Integrity vs. despair			
17.	Transpersonal	Psychic		Self-transcendence		
18.						
19.		Subtle				
20.						
21.		Causal				
22.						
23.		Nondual				

Source: Based on Wilber (1999, 633–34, 642: Charts 4A, 4B, 7).

Table D.22 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 8.

Level	Wilber *Basic structure*		Piaget *Moral*	Kohlberg *Moral*	Gilligan *Female moral*	Rawls *Moral*	Armon *The Good*
1.	Sensori-motor	Matter					
2.		Sensation					
3.		Perception					
4.		Exocept					
5.	Phantasmic-emotional	Impulse					
6.		Image	Anomy				
7.	Representational	Symbol		Magic wish			
8.		Endocept			Selfish		
9.		Concept		Punishment and obedience		Morality of authority	Radical egoism
10.	Concrete-operational	Rule/role	Heteronomy	Naive hedonism			Instrumental egoism
11.				Approval of others	Care	Morality of association	Affective mutuality
12.	Formal-operational	Formal		Law and order			Individuality
13.			Autonomy	4 ½ transition			Subjective relativism

(continued)

Table D.22 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 8.

Level	Wilber *Basic structure*		Piaget *Moral*	Kohlberg *Moral*	Gilligan *Female moral*	Rawls *Moral*	Armon *The Good*
14.	Postformal	Vision-logic		Prior rights, social contract	Universal care (hierarchical-integrative)	Morality of principles	Autonomy
15.				Universal ethical			Universal holism
16.							
17.	Transpersonal	Psychic		Universal spiritual			
18.							
19.		Subtle					
20.							
21.		Causal					
22.							
23.		Nondual					

Source: Based on Wilber (1999, 636–38: Charts 5A, 5B, 5C).

Table D.23 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 9.

Level	Wilber *Basic structure*		King/Kitchener *Reflective judgment*	Kramer *Social-cognitive judgment*	Blanchards-Fields *Socio-emotional*	Perry *Self-outlook*
1.	Sensori-motor	Matter				
2.		Sensation				
3.		Perception				
4.		Exocept				
5.	Phantasmic-emotional	Impulse				
6.		Image				
7.	Representational	Symbol	Concrete category			
8.		Endocept		Undifferentiation		
9.		Concept	Representational relations		One perspective	Dualistic
10.	Concrete-operational	Rule/role	Personal impressions	Preformism	Dualist absolutist	Early multiplicity
11.			Abstractions	Formism, mechanism	Multiple outcomes	Multiplicity
12.	Formal-operational	Formal	Relativism, contextualism	Static relativism, pluralism	Early multiple perspectives	Relativism, pluralism
13.			Early synthesis	Static systems		

(continued)

Table D.23 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 9.

Level	Wilber *Basic structure*		King/Kitchener *Reflective judgment*	Kramer *Social-cognitive judgment*	Blanchards-Fields *Socio-emotional*	Perry *Self-outlook*
14.	Postformal	Vision-logic	Synthesis	Dynamic relativism, contextualism	Multiple perspectives	Commitment (early)
15.				Dynamic dialecticism ("integration of cultural and historical systems into evolving social structures")	Integrative multiple perspective	(middle | late)
16.						
17.	Transpersonal	Psychic				
18.						
19.		Subtle				
20.						
21.		Causal				
22.						
23.		Nondual				

Source: Based on Wilber (1999, 636: Chart 5A).

Table D.24 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 10.

Level	Wilber *Basic structure*		Selman *Role-taking*	Kegan *Self*	Torbert *Action-inquiry*	Wade Self
1.	Sensori-motor	Matter				Reactive
2.		Sensation				
3.		Perception		Incorporative		
4.		Exocept				
5.	Phantasmic-emotional	Impulse				Naive
6.		Image				
7.	Representational	Symbol	Egocentric	Impulsive	Impulsive	
8.		Endocept				
9.		Concept				Egocentric
10.	Concrete-operational	Rule/role	Early role-taking	Imperial	Opportunist	
11.			Reflective roles		Diplomat	Conformist
12.	Formal-operational	Formal	Mutual role-taking, perspectivism	Interpersonal	Technician	
13.			Individual role	Formal-institutional	Achiever	Achiever or Affiliative

(continued)

Table D.24 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 10.

Level	Wilber *Basic structure*		Selman *Role-taking*	Kegan *Self*	Torbert *Action-inquiry*	Wade Self
14.	Postformal	Vision-logic	Symbolic interaction		Existential	
15.				Postformal-interindividual	Ironist	Authentic
16.						
17.	Transpersonal	Psychic				
18.						
19.		Subtle				Transcendent
20.						
21.		Causal				
22.						
23.		Nondual				Unitary

Source: Based on Wilber (1999, 633, 635–36, 638: Charts 4A, 4C, 5A, 5C).

Table D.25 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 11.

Level	Wilber *Basic structure*		Gebser *Worldview*	Bellah *Religion*	Fowler *Faith*	Graves *Ego*	Beck/Cowan *Value*
1.	Sensori-motor	Matter					
2.		Sensation			Preverbal, undifferentiated		Instinctive
3.		Perception				Autistic	
4.		Exocept					
5.	Phantasmic-emotional	Impulse	Archaic	Primitive		Magical-animistic	Magical-animistic
6.		Image					
7.	Representational	Symbol	Magic	Archaic	Magical, projective		
8.		Endocept				Egocentric	Power gods
9.		Concept					
10.	Concrete-operational	Rule/role	Mythic	Historic	Mythic-literal	Sociocentric	Absolutist-religious
11.					Conventional		
12.	Formal-operational	Formal	Mental	Early modern	Individual-reflexive	Multiplistic	Individualistic-achiever
13.				Modern	Conjunctive faith	Relativistic, individualistic	Relativistic

(continued)

Table D.25 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 11.

Level	Wilber *Basic structure*		Gebser *Worldview*	Bellah *Religion*	Fowler *Faith*	Graves *Ego*	Beck/Cowan *Value*
14.	Postformal	Vision-logic	Integral-aperspectival			Systemic (integrated)	Systematic-integrative
15.					Universalizing		
16.							Global holistic
17.	Transpersonal	Psychic					
18.							
19.		Subtle					
20.							
21.		Causal					
22.							
23.		Nondual					

Source: Based on Wilber (1999, 634–35, 639, 645: Charts 4B, 4C, 6A, 9B).

Table D.26 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 12.

Level	Wilber *Basic structure*		Plotinus	Aurobindo	Underhill *Mystic contemplation*	Brown *Meditation*	Wilber *Spirituality*
1.	Sensori-motor	Matter	Matter	Physical			
2.		Sensation	Sensation	Sensation			Archaic
3.		Perception	Perception	Perception			
4.		Exocept					Archaic-magical
5.	Phantasmic-emotional	Impulse	Pleasure/pain	Vital-emotional			
6.		Image	Images				Magical
7.	Representational	Symbol					
8.		Endocept					Magic-mythic
9.		Concept	Concepts, opinions	Lower mind	Conceptual faith and belief		
10.	Concrete-operational	Rule/role					Mythic-literal
11.							Mythic-membership
12.	Formal-operational	Formal	Logical faculty	Logical mind		(preliminary practices)	
13.							Rational-universal

(continued)

Table D.26 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 12.

Level	Wilber *Basic structure*		Plotinus	Aurobindo	Underhill *Mystic contemplation*	Brown *Meditation*	Wilber *Spirituality*
14.	Postformal	Vision-logic	Creative reason	Higher mind			Integral-holistic (global)
15.							
16.							
17.	Transpersonal	Psychic	World soul	Illumined mind	Nature mysticism (union with stream of life)	Concentration with support	Nature mysticism
18.						Transcending gross perception	
19.		Subtle		Intuitive mind	Metaphysical mysticism (recollection-archetypal, luminosity, contemplation-divine love)	Subtle perception	Deity mysticism
20.						Luminosity	
21.		Causal	Nous	Overmind		Insight	Formless mysticism
22.					Divine mysticism (dark night, union)	Cessation | Advanced insight	
23.		Nondual	Absolute one	Supermind		Enlightment	Nondual mysticism

Source: Based on Wilber (1999, 629–30, 639–40: Charts 2A, 2B, 6A, 6B).

Table D.27 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 13.

Level	Wilber *Basic structure*		Jewish tradition *Kabbalah*	Christian tradition *Great Chain of Being*	Islamic tradition *Sufism (Hazrat Inayat Khan)*	*Zikr* (Muhyiddin Ibn 'Arabi)
1.	Sensori-motor	Matter	Malkhut	Matter	Matter (nasut)	Mineral world
2.		Sensation			Vegetable	Vegetal world
3.		Perception			Animal	Animal world
4.		Exocept				
5.	Phantasmic-emotional	Impulse	Yesod	Body	Mundane person (bodily desires)	
6.		Image				
7.	Representational	Symbol				
8.		Endocept				
9.		Concept	Netzach/Hod	Mind	Material person (earthly gain)	
10.	Concrete-operational	Rule/role				
11.			Tiferet			Surface sign
12.	Formal-operational	Formal			Artistic person (beyond conventions)	
13.						Universal order

(continued)

Table D.27 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 13.

Level	Wilber *Basic structure*		Jewish tradition *Kabbalah*	Christian tradition *Great Chain of Being*	Islamic tradition *Sufism (Hazrat Inayat Khan)*	*Zikr* (Muhyiddin Ibn 'Arabi)
14.	Postformal	Vision-logic				
15.					Idealistic (universal principles)	Integral ideas
16.						
17.	Transpersonal	Psychic	Chesed/Gevurah	Soul	Djinn (genius)	Intellect in holy forms
18.					Vision mind (malkut)	Vision-wholeness
19.		Subtle	Chokhmah/Binah		Soul (angelic)	Ascending sights
20.					Akasha-archetypal | Arwah-divine luminosity	Divine light, bliss
21.		Causal	Keter Ayn	Spirit	Wahdat-witness	Witness-totality
22.					Djabrut-cessation (formless)	Gnosis (a returned one)
23.		Nondual	Ein Sof		Zat (absolut consciousness, nondual)	

Source: Based on Wilber (1999, 630, 639–40: Charts 2B, 6A, 6B).

Table D.28 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 14.

Level	Wilber *Basic structure*		Hinduist tradition *Chakras*	*Vedanta (sheats)*	Buddhist tradition *Vijnanas*	*Mahamudra meditation*
1.	Sensori-motor	Matter	Material	Material (anna-mayakosha)		
2.		Sensation				
3.		Perception			Five senses	
4.		Exocept				
5.	Phantasmic-emotional	Impulse	Emotional-sexual	Emotional-sexual (prana-mayakosha)		
6.		Image				
7.	Representational	Symbol				Concepts and beliefs of gross mind
8.		Endocept				
9.		Concept	Intentional-mind, power			
10.	Concrete-operational	Rule/role				
11.			Community-mind, love	Middle mind (mano-mayakosha)		Right beliefs
12.	Formal-operational	Formal			Manovijnana (gross-reflecting mind)	
13.			Verbal-rational mind			Universal ethical practices

(continued)

Table D.28 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – A Part 14.

Level	Wilber *Basic structure*		Hinduist tradition *Chakras*	*Vedanta (sheats)*	Buddhist tradition *Vijnanas*	*Mahamudra meditation*
14.	Postformal	Vision-logic				
15.						
16.						
17.	Transpersonal	Psychic	Psychic-mind, ajna (vision)	Higher mind (vijnana-mayakosha)	Manas (higher mind)	One-pointedness (gross union, subtle perception, luminosity)
18.						
19.		Subtle	Sahasrara, transcendental consciousness, light			
20.					Tainted alayavijnana (archetypal)	
21.		Causal		Bliss mind (ananda-mayakosha)		Simplicity (cessation, emptiness)
22.						
23.		Nondual		Brahman-Atman	Nondual consicousness	One taste | Non-meditation

Source: Based on Wilber (1999, 629–30, 639: Charts 2A, 2B, 6A).

Table D.29 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – B.

Level	Interior-individual (intentional)	Exterior-individual (behavioral)	Interior-collective (cultural)	Exterior-collective (social)
1.	Prehension	Atoms	Physical-pleromatic	Galaxies
2.		Molecules		Planets
3.	Irritability	Prokaryotes	Protoplasmic	Gaia system
4.		Eukaryotes	Vegetative	Heterotrophic ecosystems
5.	Sensation	Neuronal organisms	Locomotive	Societies with division of labor
6.	Perception	Neural cord organisms		
7.	Impulse	Reptilian brain-stem organisms	Uroboic	Groups/families
8.	Emotion	Limbic system organisms	Typhonic	
9.	Symbols	Neocortex (triune brain) organisms	Archaic	Tribes (foraging)
10.	Concepts	Complex neocortex organisms	Magic	Tribal/village (horticultural)
11.	Concrete operations	(structure function 1)	Mythic	Early state/empire (agrarian)
12.	Formal operations	(structure function 2)	Rational	Nation/state (industrial)
13.	Vision-logic	(structure function 3)	Centauric	Planetary (informational)

Source: Based on Wilber (2000, 198: Figure 5-1).

Table D.30 Correlation of models of Integrative Levels of Knowing (Ken Wilber) – C.

Level	Wilber *Cognition*	Piaget *Cognition*	Commons/Richards *Cognition*	Aurobindo *Cognition*	Kegan *Consciousness*	Cook-Greuter *Self-identity*	Graves *Value*	Fowler *Faith*
1. Infrared		Sensorimotor				Symbiotic		Undifferentiated
2. Magenta	Symbolic	Preoperational			1st Order	Impulsive	Magic-animistic	Magical
3. Red	Conceptual				2nd Order	Self-protective	Egocentric	Mythic-literal
4. Amber	Rule/role	Concrete-operational			3rd Order	Conformist	Absolutistic	Conventional
5. Orange	Rational	Formal-operational			4th Order	Conscientious	Multiplistic	Individual-reflexive
6. Green	Pluralistic		Meta-systemic		(4.5 Order)	Individualistic	Relativistic	Conjunctive
7. Teal	Low vision-logic		Paradigmatic			Autonomous	Systemic	Universalizing-Commonwealth
8. Turquoise	High vision-logic		Cross-paradigmatic	Higher mind	5th Order	Construct-aware		
9. Indigo	Psychic			Illumined mind		(Ego-aware)		
10. Violet	Subtle			Intuitive mind				
11. Ultraviolet	Causal			Overmind		Transpersonal		
12. Clear light	Nondual			Supermind				

Source: Based on Wilber (2006, 68–69: Figures 2.4, 2.5).

Appendix E Document Indexing Based on Integrative Levels of Knowing

Table E.1 Examples of viewpoint analysis and indexing based on various models of Integrative Levels of Knowing.

Document	Significant features	Integrative Level of Knowing	Reference
The Sorcerer, cave painting in the Cave of the Trois-Frères, Ariège, France (c. 13,000 BCE)	Representation of mythical creature with human and animal characteristics. Artistic creation of something new from known elements. Artwork with symbolic function in a social, maybe ritualistic context. Archaic thinking based on images and symbols with magical and animistic elements.	*Level of preoperational cognition* according to Piaget's model of logico-mathematical development.	Klix (1993, 191–93, 206–8, 363, 387)
Tales of Australian Aborigines (oral tradition) [e.g., *Aboriginal Legends* edited by David Unaipon (1927), M.K.]	String of tales about certain ancestral heroes among many Australian Aborigines. Folktales rather then epic myths. Brief, often elliptical and unconnected stories with loose collection of facts, places, rules, powers, and beings. Without much concern for chronology or logical interrelations. Lack of large-scale organizing elements or a single narrative plot.	*Level of preoperational cognition* according to Piaget's model of logico-mathematical development. *Level of primitive culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 59, 89–90)
Epic of Gilgamesh (c. 2,100–1,000 BCE)	Long and complex epic myth. Interrelation of many parts of a longer story in a single plot. Older stories placed within a larger and new narrative framework. The adventures of Gilgamesh and his friend Enkidu had to take place in a sequence after the taming of the wild Enkidu and before his death. The search by Gilgamesh for immortality had to follow his bereavement over Enkidu's death and be a result of it. Each complex part of the story builds logically upon another part.	*Level of concrete-operational cognition* according to Piaget's model of logico-mathematical development. *Level of archaic culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 89–90, 258)

(continued)

Table E.1 Examples of viewpoint analysis and indexing based on various models of Integrative Levels of Knowing.

Document	Significant features	Integrative Level of Knowing	Reference
Rig Veda (c. 1,500–800 BCE)	Collection of sacred texts originating in hymns and other religious material. Mostly polytheistic and concerned with ritual appeasement of the gods and manipulation of various kinds of sacred or magical power. General tone is concrete and mythological. Unreflected thought. Major attribute of the gods is not moral rectitude but sheer power. In most recently written parts (e.g., book X) speculation about the origin of the universe, reflection upon the problem of establishing the single unity behind all diversity, the single source of all multiplicity. Monotheistic and monistic tendencies.	Mainly *level of concrete-operational*, partly early forms of *level of formal-operational cognition* according to Piaget's model of logico-mathematical development. Mainly *level of archaic culture*, partly early forms of *level of classical or axial culture* according to Barnes's model scientific and religious development.	Barnes (2000, 97–98, 260)
Tutankhamun's Painted Box, painting (c. 1,320 BCE)	Aspective representation with a lack of spatial depth and a strict profile display. Persons are depicted in different sizes according to their importance. Size, form, and color of entities remain constant independently from distance and perspective. Landscape is indicated only by some plants and thus as a place, not as a space.	*Level of preoperational cognition* according to Piaget's model of logico-mathematical development.	Brunner-Traut (1992, 14–17, 58–59)
Pan Geng chapter of *Shujing* (*Book of Documents*) (c. 1,100 BCE)	Speech attributed to Shang dynasty king Pan Geng, around 1,400 BCE. Orientation towards role and upholding of the system instead of preference for kin. Establishment of a political state order. Announcement that Pan Geng will "punish by death all those who commit crimes and display the goodness of those who show virtuous behavior, regardless of how distant or near they stand (to me)." He demands that his subordinates "fear" him, the "one man," and accept his authority, since otherwise the whole state would break into parts and "we will all together sink in ruin." Hence, everybody is admonished to "fulfill his business and get his position in order."	*Level of social system and conscience (conventional moral judgment)* according to Kohlberg's model of moral development.	Roetz (1993, 35)

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Table E.1 Examples of viewpoint analysis and indexing based on various models of Integrative Levels of Knowing.

Document	Significant features	Integrative Level of Knowing	Reference
Mahabharata, including *Bhagavat Gita* (c. 900–400 BCE)	Collection of stories and wisdom. The great battle that is its central event is prefaced and surrounded by multiple stories. The teachings of the *Bhagavat Gita* is similar to that of the *Upanishads* but in the form of a story about the warrior Arjuna and his charioteer Krishna as an incarnation of the god Vishnu. Typically mythical and history-like narrative of significant deeds by gods and demons. It gathers together in one place an enormous amount of traditional material about the origin of things, the nature of human life, the basic structure of the cosmos, and how everything led up to the major events of the narrative.	*Level of concrete-operational cognition* according to Piaget's model of logico-mathematical development. *Level of archaic culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 89–90, 101)
Mukhya Upanishads (*Principal Upanishads*) (c. 800–300 BCE)	Commentaries on the Vedas, mostly on the few lines that show an incipient monotheism and monism. Shift from polytheism toward belief in a single Ultimate or a single supreme personal Being. A few lines that suggest belief in a Reality that transcends even personness. It is philosophical in that it offers rather orderly analyses of the structure of the universe and human life.	Early forms of *level of formal-operational cognition* according to Piaget's model of logico-mathematical development. *Level of classical or axial culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 98–99)

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Table E.1 Examples of viewpoint analysis and indexing based on various models of Integrative Levels of Knowing.

Document	Significant features	Integrative Level of Knowing	Reference
Illiad attributed to Homer (c. 750 BCE)	Long and complex epic myth. Older stories placed within a larger and new narrative framework. Belief in gods. People do not have language for identifying own feelings and inner thoughts very well as their own but think of them as placed in the person by a god. External factors such as wealth and power, and especially heroism, count. Using guile to achieve success is an admirable skill. The highest goal in life is to earn esteem through heroic accomplishments, especially as a warrior. Individual human beings as such has no rights. There are no universal standards of justice or truth against which a person could measure self-worth. It is a shame culture rather than a guilt culture.	*Level of concrete-operational cognition* according to Piaget's model of logico-mathematical development. *Level of preconventional moral judgement* according to Kohlberg's model of moral development. *Level of archaic culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 89–90, 107–8)
	Lack of the concepts of consciousness, self, and will. Protagonists like the hero Achill do not consider the consequences of their actions, show a lack of subjectivity, are not able to take the perspective of others or to reflect complex situations. His decisions are guided externally by gods, for example, when Athena intervenes in order to stop Achill to kill Agamemnon in rage.	*Level of preoperational cognition* and *level of concrete-operational cognition* according to Piaget's model of logico-mathematical development.	Bammé (2011, 175, 179–82, 188, 270–71)
Odyssey attributed to Homer (c. 700 BCE)	Early forms of ego identity. The hero Odysseus considers the consequences of his actions, is able to reflect on complex situations and to take the perspective of his opponents like those of the cyclops Polyphem. Significant use of abstract terms. Beginning of personal responsibility and moral consciousness.	Mainly *level of concrete-operational cognition*, partly early forms of *level of formal-operational cognition* according to Piaget's model of logico-mathematical development.	Bammé (2011, 175, 179, 180–82, 188, 195–96, 270–71)

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Table E.1 Examples of viewpoint analysis and indexing based on various models of Integrative Levels of Knowing.

Document	Significant features	Integrative Level of Knowing	Reference
Theogony by Hesiod (c. 700 BCE)	Cosmological and theogonic poem compiling views based on a rich religious heritage. Narrative account expressed in mythopoetic language of the origin and emergence of the present structure of the physical universe, and of the origin, genealogy, conflicts among, and present control over the universe of the gods. It contains a personified or anthropomorphic interpretation of the physical features of the universe, of social, artistic, and political functions, and of various human traits. Mythical-religious cognitive framework and primitive thought utilizing concrete descriptions and explanations as narrative stories more than it does abstract concepts and theoretical interpretations.	*Level of preoperational cognition* and *level of concrete-operational cognition* according to Piaget's model of logico-mathematical development.	Schlagel (1995, 67, 79, 84)
Carmina Archilochi by Archilochos (c. 650 BCE)	Poetry of an author who speaks of himself as individual person. Discovery of the self. Early forms of ego-identity and autonomy. Distinction between objectivity and subjectivity, as well as between human and divine spheres. World ruled by objective laws instead of gods.	Mainly *level of concrete-operational cognition*, partly early forms of *level of formal-operational cognition* according to Piaget's model of logico-mathematical development.	Bammé (2011, 200–204)
Dao De Jing attributed to Laozi (c. 600–300 BCE)	Search for a single Ultimate Reality and the Ultimate Way (Tao) of things. Universalizing approach. Emphasis on impersonal forces of nature.	Early forms of *level of formal-operational cognition* according to Piaget's model of logico-mathematical development. *Level of classical or axial culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 103–5)

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Table E.1 Examples of viewpoint analysis and indexing based on various models of Integrative Levels of Knowing.

Document	Significant features	Integrative Level of Knowing	Reference
Philosophical fragments of the pre-Socratics (e.g., Thales, Anaximenes, Anaximander, Pythagoras, Heraclitus, Parmenides, Leucippus, Democritus) (c. 600–370 BCE)	Philosophizing about the basic stuff of which all things are made and the basic processes by which all things take place. Prose reflection and analysis. Determination of how to distinguish truth from mere opinion, and how to make language clear for the sake of rational argument.	Early forms of *level of formal-operational cognition* according to Piaget's model of logico-mathematical development. *Level of classical or axial culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 108–9)
[e.g., *The Fragments of the Pre-Socratics* edited by Hermann Diels (1903), M.K.]	Early form of scientific rationalism. Emancipation from religious heritage but still traces of mythical thought. Rational speculative cosmology with increasing rationality compared to earlier mythical theogonies and cosmogonies. Incorporation of new principles of interpretation, such as the principle of sufficient reason, and new abstractions derived from natural processes. Search for first principles and the reality behind phenomena.	*Level of concrete-operational cognition* and early forms of *level of formal-operational cognition* according to Piaget's model of logico-mathematical development.	Schlagel (1995, 78–81, 85)
Recorded sayings of Buddha, Confucius, the Jewish prophets, Jesus and Muhammad (c. 550 BCE to 650 CE)	Reflection on society as a whole, on individuals independently of social status. Distinction between general moral principles and duties or customs. Critical approach to the claims of custom and convention. Emphasis on the importance of conscience. Awareness of the significance of intention and motive. Integrated analysis of the components of the human personality.	*Level of social contract or utility and individual rights (postconventional moral judgement)* according to Kohlberg's model of moral development.	Hallpike (2004, 300–301)

(continued)

Table E.1 Examples of viewpoint analysis and indexing based on various models of Integrative Levels of Knowing.

Document	Significant features	Integrative Level of Knowing	Reference
Commentary of Zuo attributed to Zuo Qiuming (c. 500–300 BCE)	Commentaries on the *Spring and Autumn Annals*. Revision, expansion, and compilation of briefer narratives. Older stories placed within a larger and new narrative framework. Interrelation of many parts of a longer story in a single plot.	*Level of concrete-operational cognition* according to Piaget's model of logico-mathematical development. *Level of archaic culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 89, 258)
Ramayana (c. 500–200 BCE)	Delineation of the basic truth of karma and dharma through the story of prince Rama as an incarnation of the god Vishnu. Typically mythical and history-like narrative of significant deeds by gods and demons. It gathers together in one place an enormous amount of traditional material about the origin of things, the nature of human life, the basic structure of the cosmos, and how everything led up to the major events of the narrative.	*Level of concrete-operational cognition* according to Piaget's model of logico-mathematical development. *Level of archaic culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 90, 101)
Analects attributed to Confucius (c. 480–220 BCE)	Reflection on concepts from the ethical canon. Distinction between ethical life and morality, as well as between propriety (*li*) and humaneness (*ren*). Humaneness is not to be played off against conventional ethos, but is to safeguard it. Humaneness, however, is the necessary corrective which is to protect the conventional ethos against degenerating into a superficial and exploitable formalism. The principle of fairness represents a formal procedure rather than a virtue. This procedure does not depend on any tradition-impregnated casuistry nor on conventional values. It only depends on imaginatively putting oneself in the place of the other on the basis of the actor's generalized wants, without specifying these beforehand. Individual's inner self as basis of ethical life.	Early forms of *level of social contract or utility and individual rights (postconventional moral judgement)* according to Kohlberg's model of moral development.	Roetz (1993, 46, 52, 123, 135)

(continued)

Table E.1 Examples of viewpoint analysis and indexing based on various models of Integrative Levels of Knowing.

Document	Significant features	Integrative Level of Knowing	Reference
Mozi attributed to Mozi (c. 470–220 BCE)	Form of orderly essay, not mythic narrative. Universalist moral standards superior to the social requirements of one's time and place. Universal and egalitarian love of everyone, including strangers. Elaboration on universalist criteria of truth.	Early forms of *level of formal-operational cognition* according to Piaget's model of logico-mathematical development. *Level of classical or axial culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 105–6)
	Thematic treatises set up criteria of validity and try to convince the reader by long-winded and ponderous chains of arguments. Utilitarianism and ethics of absolute reciprocity. Rejection of the idea that one's own family or state should take precedence over families and states of others. Concept of humaneness which means to benefit others as one benefits oneself. Abstraction of the "other" and ethical universalism. The entirety of mankind, including the "barbarian" tribes, equally falls within the subject range of moral responsibility.	*Level of social contract or utility and individual rights (postconventional moral judgement)* according to Kohlberg's model of moral development.	Roetz (1993, 234–35, 242–43)
Zhuangzi attributed to Zhuangzi (c. 400–100 BCE)	The gesture of exposing moralism, the nonconformist symbolism is replete with, the rejection of conventional compulsion, and the emphasis on individual life—all this fits well into the phase of youthful protest. From here, the defiant applause for the robber, the glorification of the freedom of the childhood, and the defense of opportunism also explain themselves. They are linked together by one and the same deeper structure of a *postconventional recourse to the preconventional past.* Defying adjustments and normality, fueled by a deep feeling of alienation with sentimental overtones.	*Level of postconventional but not yet principled moral judgment (Stage 4 ½)* according to Kohlberg's model of moral development.	Roetz (1993, 257)

(continued)

Table E.1 Examples of viewpoint analysis and indexing based on various models of Integrative Levels of Knowing.

Document	Significant features	Integrative Level of Knowing	Reference
Classics of Mountains and Seas (c. 400 BCE – 100 CE)	Collection of brief stories and folktale myths. Throughout the stories the standard mythic events and heroes explain the origins of farming and fire, tell of metamorphoses and virgin birth, and dream of immortality. Lack of larger, coherent narrative or logical connection.	*Level of preoperational cognition* according to Piaget's model of logico-mathematical development. *Level of primitive culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 102–3)
Meno by Plato (c. 385 BCE)	Transcendence of merely local customs and laws. Elaboration of universal ethical norms that in theory could be applied impersonally to everyone. When asked to describe what true excellence or virtue (*arete*) is in a person, Meno at first praises a person who fits with the ordinary (and archaic) moral sensibility of his time, one who achieves success for self and friends, ideally also doing damage to their enemies. Socrates then begins to push Meno to acknowledge a more universal and objective sense of justice, which should be applied to any person equally.	*Level of classical or axial culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 110)
Physics by Aristotle (c. 350 BCE)	Things are viewed as acting under their own powers. Vocabulary of metaphysics (e.g., "substance," "entity," "reality," "actor," "creator," or "cause").	*Level of self-action* according to Dewey's and Benthley's model of naming and knowing development.	Dewey and Bentley (1949, 131–34)
Arthasastra by Kautilya (c. 300 BCE)	*Samkhya* philosophy (*samkhya* means "enumeration" or "calculation") concerned with the enumeration of the basic principles of the universe and of knowledge. Development of formal logic and methods of knowing.	Early forms of *level of formal-operational cognition* according to Piaget's model of logico-mathematical development. *Level of classical or axial culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 99, 261)

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Table E.1 Examples of viewpoint analysis and indexing based on various models of Integrative Levels of Knowing.

Document	Significant features	Integrative Level of Knowing	Reference
Nyaya Sutra (c. 300–200 BCE)	Reflection about the reality (or unreality) of the universe, about its most basic structural aspects, and about the problem of knowing. Formal logic.	Early forms of *level of formal-operational cognition* according to Piaget's model of logico-mathematical development. *Level of classical or axial culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 100)
Xunzi attributed to Xunzi (c. 250 BCE)	Ethical reflections. Mere performance of roles, without considering the underlying inner attitude, can be morally indifferent or even wrong. Distinction of several stages of morally relevant action, the "minor conduct" (service to the family), the "medium conduct" (doing one's duty in an office), and the "great conduct" (following neither the father nor the ruler, but justice and the Dao). The latter and normatively highest evaluated stage transcends the limits of convention.	Early forms of *level of social contract or utility and individual rights (postconventional moral judgement)* according to Kohlberg's model of moral development.	Roetz (1993, 64–65, 269, 274)
New Testament (c. 50–140 CE)	There are two alternative statements of the Golden Rule. The first can be seen in the fairness orientation as "Do unto others as you would have them do unto you." The second version is phrased in terms of the orientation of care as "Love thy neighbour as thyself." Considerations of care and justice presenting, as modern moral philosophy does, a view of justice which is beyond either strict contract, strict retribution, or strict obedience to rules. Rather it is a view of justice which focuses on ideal role-taking, a principle which can be called, alternatively, respect for persons (i.e., justice) or caring for persons as ideal ends in themselves (i.e., ethic of care).	Early forms of *level of universal ethical principles (postconventional moral judgement)* according to Kohlberg's model of moral development.	Kohlberg, Levine and Hewer (1983, 138)

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Table E.1 Examples of viewpoint analysis and indexing based on various models of Integrative Levels of Knowing.

Document	Significant features	Integrative Level of Knowing	Reference
Physiologus (c. 100–400 CE)	Piecemeal allegorical interpretation of nature that lacks rational analysis and systematization. Animal lore attending to the habits of animals in order to learn moral lessons rather than understand nature. It begins, for example, with a description of the lion that masks its tracks from the hunter by whisking its tail over them as it walks, just as Jesus masked his divinity from unbelievers. The problem with this pious use of natural history is that it is wrong about the actual behavior of lions.	*Level of concrete-operational cognition* according to Piaget's model of logico-mathematical development. *Level of archaic culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 124, 131)
Outlines of Skepticism by Sextus Empiricus (c. 200 CE)	Summary and analysis of skeptical arguments as to why no one can really know what is true or not, nor what is good or not, and therefore should employ a suspension of all judgement. Skeptical stance that foreshadows late twentieth-century arguments about the possibility of reliable knowledge, including scientific knowledge, about cultural relativism, about the theory of the social construction of knowledge, and about antifoundationalism.	Late forms of *level of formal-operational cognition* according to Piaget's model of logico-mathematical development.	Barnes (2000, 122–24)
Samkhyakarika attributed to Isvarakrshna (c. 350 CE)	Classic formulation of *Samkhya* philosophy (*samkhya* means "enumeration" or "calculation") concerned with the enumeration of the basic principles of the universe and of knowledge. Development of formal logic and methods of knowing. Explicit abstract theory of causation: Every effect preexists in its cause; out of nothing comes nothing, so all that occurs is a change in preexisting reality.	Early forms of *level of formal-operational cognition* according to Piaget's model of logico-mathematical development. *Level of classical or axial culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 99, 261)

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Table E.1 Examples of viewpoint analysis and indexing based on various models of Integrative Levels of Knowing.

Document	Significant features	Integrative Level of Knowing	Reference
Tattvopaplavisimha by Jayarasi (c. 800 CE)	*Carvaka* philosophy concerned with the analysis of the nature of all reality and of the means by which we know reality in order to arrive at a skepticism about the gods, about future life, and about inference. Rejection of the possibility of making valid inferences on the basis of sense experience. Concern for methods of knowing (Kitchener's "metacognition").	*Level of formal-operational cognition* according to Piaget's model of logico-mathematical development. *Level of classical or axial culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 100)
Leges Henrici Primi (*Laws of Henry I*) (c. 1114–1118)	Confusion or interchangeability of intention and behavior. The compiler discusses homicide without differentiating among intentional slayings, deaths caused by negligence, and those resulting from unavoidable fault. Maxim: who unknowingly commits a wrong knowingly shall make amends. Lack of abstract principles. Conception of justice as exchange between autonomous individuals.	*Level of Individualism, instrumental purpose, and exchange (preconventional moral judgement)* according to Kohlberg's model of moral development.	Radding (1978, 578–79, 586)
Song of the Nibelungs (c. 1250)	Morality of loyalty. Conventions of tribal society.	*Level of mutual interpersonal expectations, relationships, and interpersonal conformity (conventional moral judgment)* according to Kohlberg's model of moral development.	Apel (1988, 473)
Holy Trinity, painting by Masaccio (c. 1425)	Representation based on central perspective in which vanishing lines are united in a uniform vanishing point.	*Level of formal-operational cognition* according to Piaget's model of logico-mathematical development.	Brunner-Traut (1992, 9, 58–59)

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Table E.1 Examples of viewpoint analysis and indexing based on various models of Integrative Levels of Knowing.

Document	Significant features	Integrative Level of Knowing	Reference
View of an Ideal Town, painting by Pierro della Francesca (c. 1470)	Representation as arrangement of spatial figures within coordinate system. Central perspective as a formal logic that is applicable to any content. Still confined to empirical reality and concrete features. Projective and Euclidean spatial relations. Static viewpoint of a single observer. Separation of observer and world.	*Level of concrete-operational cognition* according to Piaget's model of logico-mathematical development. *Level of iconic mode of representation* according to Gablik's model of artistic development.	Gablik (1979, 43, 69–70, 74)
Novum Organum by Francis Bacon (1620)	Compendium of how induction may be used to generate hypotheses as the "first vintage" or preliminary interpretation, and how those hypotheses may be subjected to a wide variety of types of tests. Any idea (fact, law, hypothesis, theory, paradigm) can be tested by reference to empirical evidence. Recognition of the open-ended character of empirical testing.	Late forms of *level of formal-operational cognition* according to Piaget's model of logico-mathematical development. *Level of empirical-critical culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 150, 183)
Prince Balthasar Carlos on Horseback, painting by Diego Velázquez (c. 1635-36)	Representation based on oblique projection and body perspective. All elements of the painting, the horse, the rider, and the landscape, are related to each other and build a unity that suggests spatial depth.	*Level of formal-operational cognition* according to Piaget's model of logico-mathematical development.	Brunner-Traut (1992, 15–16, 58–59)
Discourses and Mathematical Demonstrations Relating to Two New Sciences by Galileo Galilei (1638)	Thing is balanced against thing in causal interconnection. Concept of inertia: a mass once in motion continues in motion in a straight line, if not interfered with by other moving masses.	*Level of interaction* according to Dewey's and Benthley's model of naming and knowing development.	Dewey and Bentley (1949, 131–34)

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Table E.1 Examples of viewpoint analysis and indexing based on various models of Integrative Levels of Knowing.

Document	Significant features	Integrative Level of Knowing	Reference
Philosophiae Naturalis Principia Mathematica (*Mathematical Principles of Natural Philosophy*) by Isaac Newton (1687)	Thing is balanced against thing in causal interconnection. Space and time as absolute and fixed, omitted from the process itself. Interactional systems (e.g., "particles," "principle," "law").	*Level of interaction* according to Dewey's and Benthley's model of naming and knowing development.	Dewey and Bentley (1949, 131–34)
The Social Contract by Jean-Jacques Rousseau (1762)	Theory of inalienable rights of liberty, rights of autonomy of the individuals, and principles of democracy based on a social contract.	*Level of social contract or utility and individual rights (postconventional moral judgement)* according to Kohlberg's model of moral development.	Bammé (2011, 566)
United States Declaration of Independence (1776)	Foundation of constitutional democracy that presumes attitudes of mutual respect among citizens. Such respect makes possible the recognition of rights existing prior to a social contract—the "inalienable rights" of the Declaration of Independence. Such rights are inalienable because they are inherent in the preexisting moral relationship of mutual respect. The democratic (or representative) form of government reflects the relationship of mutual respect. In addition, the procedures for creating, administering, and adjudicating public law reflect the relationship of rational debate. The right of free speech and press and the right to petition Congress stem from the necessity of gathering all relevant information before a decision. Rules of procedure are designed to allow all sides to be heard. Due process in both execution and adjudication of laws reflects a desire to ensure that all interests have an opportunity to be heard.	*Level of social contract or utility and individual rights (postconventional moral judgement)* according to Kohlberg's model of moral development.	Rosenberg, Ward and Chilton (1988, 152)

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Table E.1 Examples of viewpoint analysis and indexing based on various models of Integrative Levels of Knowing.

Document	Significant features	Integrative Level of Knowing	Reference
Constitution of the United States of America (1787)	Individual's moral orientation is not any longer based on conventional norms and laws of the society but on the reciprocity of human obligations, that is, concluded contracts and agreements legitimized by their utility.	*Level of social contract or utility and individual rights (postconventional moral judgement)* according to Kohlberg's model of moral development.	Apel (1988, 191)
Groundwork of the Metaphysics of Morals by Immanuel Kant (1785)	Conception of the categorical imperative. Legitimization of an action maxim that should become a universal law is based on taking the perspectives of all participants and their assessment of the situation. Generalization and reflexive internalization of the reciprocity of role-taking.	*Level of universal ethical principles (postconventional moral judgement)* according to Kohlberg's model of moral development.	Apel (1988, 192)
Birth of Bhéma, painting by Kangra school (c. 1810–25)	Space is conceived on the basis of a linear order formed through the progressive combining of proximities: five distinct groups of figures exist as a set of neighbouring elements in five separate spaces. The eye revolves around each group individually, whereas in a fully developed projective system the eye of the observer is established as the central point around which revolve the form of object. In a topologically ordered spatial system, there is nothing outside the given configuration to act as a reference frame, and consequently there is no conservation of size or distance.	*Level of preoperational cognition* according to Piaget's model of logico-mathematical development. *Level of enactive mode of representation* according to Gablik's model of artistic development.	Gablik (1979, 43, 51, 57)
Beyond Good and Evil by Friedrich Nietzsche (1886)	Naturalistic reductionism that seeks to expose genealogically the validity claims of morality as being based on irrational motives. Moral conscience is considered to be a pathological inversion of the "will to power." Total denunciation of all universal claims of equality in the sense of human rights.	*Level of postconventional but not yet principled moral judgment (Stage 4 ½)* according to Kohlberg's model of moral development.	Apel (1988, 387–88)

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Table E.1 Examples of viewpoint analysis and indexing based on various models of Integrative Levels of Knowing.

Document	Significant features	Integrative Level of Knowing	Reference
On the General Theory of Relativity, by Albert Einstein (1915)	Systems of description and naming are employed to deal with aspects and phases of action, without final attribution to "elements" or other presumptively detachable or independent "entities," "essences," or "realities," and without isolation of presumptively detachable "relations" from such detachable "elements." Space and time brought into the investigation as among the events investigated.	*Level of transaction* according to Dewey's and Benthley's model of naming and knowing development.	Dewey and Bentley (1949, 131–34)
Pronounced Rose, No. 573, painting by Wassily Kandinsky (1932)	Non-objective picture with indeterminate, atmospheric space. Construction of independent relational entities without reference to empirical reality. There is an increase in the autonomy of forms to the point where even abstract forms devoid of content can be constructed and manipulated. Art becomes syntactic in character, operating on sets of pure relations. The square, circle, cube, rectangle, and triangle form a natural grammatical unit, a "kernel sentence" from which all combinations become possible.	*Level of formal-operational cognition* according to Piaget's model of logico-mathematical development. *Level of symbolic mode of representation* according to Gablik's model of artistic development.	Gablik (1979, 43, 84, 91, 118)
Dynamics of Faith by Paul Tillich (1967)	Correlational theology that relates basic human experience of existential dismay to a rather liberalized Christianity. Critical awareness that images and doctrines of the Christian heritage are "broken myths" because we recognize that they are symbols and not literal truths. Affirmation of a reflexively critical approach to the religious truth-claims of the Christian tradition in harmony with the modern empirical-critical method in science. If the practice of modern science have made contemporary people more aware of themselves as limited knowers, at work in an evolutionary universe, then science may be directing people's awareness to the real issue of God: Ultimacy of Infinite Mystery.	Late forms of *level of formal-operational cognition* according to Piaget's model of logico-mathematical development. *Level of empirical-critical culture* according to Barnes's model of scientific and religious development.	Barnes (2000, 227–29)

(continued)

Table E.1 Examples of viewpoint analysis and indexing based on various models of Integrative Levels of Knowing.

Document	Significant features	Integrative Level of Knowing	Reference
A Theory of Justice by John Rawls (1971)	Striving for rational consensus on the content of the right in disagreement about justice. The claim of agreement represents a norm of moral rationality analogous to norms of scientific rationality in the discussion of the philosophy of science. Moral principles are designed to reach agreement in situations of potential moral conflict or disagreement among individuals. Justice as fairness and reversibility. Reversibility implies a conception of justice which requires each person to systematically take the position of everyone else in the situation until a fairly balanced solution emerges.	*Level of universal ethical principles (postconventional moral judgement)* according to Kohlberg's model of moral development.	Kohlberg, Levine and Hewer (1983, 61–62, 95)